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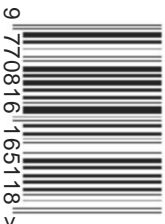
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Australian Geographic July – August 2019



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**The 5400km, 140-year-old**  
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## Australian GEOGRAPHIC

Find all this issue's related content at:  
[australiangeographic.com.au/issue151](http://australiangeographic.com.au/issue151)

**DONATE:** Save the BRUSH-TAILED ROCK-WALLABY (p34).

**SEE:** More photos of a rarity – flooded Lake Eyre (p106).

**WIN:** An Echoes of Australian Fauna night parrot coin, valued at \$140 (p31).

Members of Aboriginal communities are warned that this edition of AUSTRALIAN GEOGRAPHIC may contain images and names of deceased individuals.



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## Subscribe and save

Subscribe to **Australian Geographic** for two years and save over \$49 plus receive our brand new **Islands** book!

See page 52 for more details

## On the cover



**The endangered eastern quoll** once ranged across much of south-eastern Australia and up to northern NSW. The last members of the mainland population died out in about 1963, but these quolls

remain in Tasmania, mainly in the eastern part of the state. This little lovely was photographed by Sean Crane at the Bonorong Wildlife Sanctuary near Hobart. See page 66.



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## Putting the record straight



THOSE OF US old enough to remember the first Moon landing in 1969 undoubtedly maintain a special fascination for the historic event.

It was arguably

the first truly global moment and what made it so were the pictures of Neil Armstrong climbing off that last rung of the ladder and setting foot on the Moon before uttering those unforgettable words. It was seen at the same time everywhere in the world that had access to television at that time of day. It was a great step forward for all humanity, transcending even the Cold War space race that gave it such impetus – at least to those of us too young to understand such things and still young enough to be transfixed by breathtaking feats of human endeavour. Those first few minutes of black-and-white footage that briefly united the world were visible thanks to the brilliance of a small space tracking station outside Canberra at Honeysuckle Creek.

The role played by Honeysuckle Creek in the moon-walk broadcast has been overshadowed by the popular movie *The Dish* that told the story of the later part of the moon walk when

the much bigger Parkes radio telescope came online and relayed the rest of the transmission. In this issue, and on the 50th anniversary of the Apollo 11 Moon shot, writer Andrew Tink sets the record straight at last through his compelling story of the clever Aussies who made that critical first broadcast possible and of their remarkable leader, the late Tom Reid, a man with whom Andrew had a special personal connection.

An event that's more likely to divide Australians is the closure of the Uluru climb. Sam Duncan gets to grips with all points of view in this hot debate and looks at the many other, and safer, ways to experience this most iconic Australian landscape and its unique *Anangu* culture.

We're thrilled to announce the recent launch of our already popular new podcast service, Australia Talking. Many of the faces and voices you know from the magazine will spring to life in our weekly podcasts through conversations with people such as Terri Irwin, Valerie Taylor and Tim Flannery among many other explorers, adventurers and conservationists. The free podcast went straight to number one in its category on the iTunes chart. See what all the fuss is about on page 25 and tune in now.

Chissie Goldrick

## Notes from the field

With a legal and political background, writing about how Canberra's Honeysuckle Creek tracking station brought live TV pictures of Neil Armstrong's first step on the Moon to a global audience wasn't easy for Andrew Tink. (Andrew's a former shadow attorney-general and shadow leader of the NSW Parliament.)

"The technical aspects seemed daunting. But I'd come to know a little of Honeysuckle's story and that of its director, Tom Reid, when I dated his daughter, Marg, during the early 1970s," Andrew says. "Many years later, after watching *The Dish*, which placed all the action at the Parkes radio telescope, I became sufficiently fired up to tell what really happened," says Andrew, explaining the genesis of his book *Honeysuckle Creek: The Story of Tom Reid, a Little Dish and Neil Armstrong's First Step*.

To lighten the technical side, Andrew decided to include the story of Tom Reid's amazing life and his own time with Marg Reid. "So I gingerly sounded out my wife, Kerry, as well as Marg and the rest of her family. And after I promised to circulate all drafts, everyone came on board," Andrew says. Tom Reid died in 2010, but the surviving space trackers, now in their 80s, were as sharp as ever and Andrew's main problem was getting them to slow down and explain their technical jargon in language we could all understand. Andrew drew on his research for that book to write our exclusive insight into the 50th anniversary of the Apollo 11 mission (page 54).

### 2019 AUSTRALIAN GEOGRAPHIC SOCIETY GALA AWARDS NIGHT SPONSORS



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## Notes from the field

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AUSTRALIAN GEOGRAPHIC is printed in Australia by Blue Star WEB, Unit 1/83 Derby Street, Silverwater NSW 2128 under ISO 14001 Environmental Certification.



AUSTRALIAN GEOGRAPHIC, journal of the Australian Geographic Society, is published six times a year (cover dates Jan–Feb, Mar–Apr, May–Jun, Jul–Aug, Sep–Oct, Nov–Dec) by Australian Geographic Holdings Pty Ltd (ABN 12 624 547 922), 52–54 Turner Street, Redfern NSW 2016. The trademark Australian Geographic is the property of Australian Geographic Holdings Pty Ltd. All material © 2019. All rights reserved. No part of the contents of this publication may be reproduced without the prior written consent of the editor-in-chief. This issue went to press 17.06.2019

AC/DC fan Steven Kirkby enjoys a comfort stop at William Creek during the 2019 Shitbox Rally.



For this issue our editor-in-chief, Chrissie Goldrick, a keen photographer, took to the skies to shoot one of her occasional travel stories for the magazine and ended up witnessing a special natural event (page 106). “I’m self-taught and had no formal instruction, so I was keen to find out what I’d missed,” she says about her decision to attend a Canon Collective workshop on location at **Kati Thanda-Lake Eyre**, in May. Chrissie shoots with Canon gear, as do many of our pro photographers. “It was organised months before, so I had no inkling we’d end up being there for a rare flooding event,” she explains. As a result of water filling the lake, the nearby town of William Creek was packed with visitors during the Canon photo weekend. “Some had come to see the flooding phenomenon, others because those same waters had closed the Birdsville Track and sent travellers along the Oodnadatta Track,” Chrissie says. “I loved the crazy comings and goings of William Creek. Between the famous bar of the hotel there and the busy airstrip, something was always

happening. On the last day, the Shitbox Rally rolled into town – a huge convoy of old cars, each bought for less than \$1000 – on their way from Perth to Sydney via Uluru. The cars were wonderfully customised and the crews were all blinged up. They briefly turned William Creek into a party town before heading off on the second half of their 5150km journey.”

When Sam Duncan, on his first assignment for us, first saw **Uluru**, he looked straight at it, tried to extract some meaning and have “the experience” then and there, as is very much the Western way. “It’s beautiful to look at, sure, but for me, the real beauty emerged in unexpected places, bit by bit, with each day I spent there,” Sam says. “On one occasion, I was walking towards the base and found myself alone in a mulga forest, one of the most peaceful places I’ve ever set foot in. Another time, I was sitting at a table under the stars on a remote desert dune sharing dinner with a group of people I’d not met before. We all felt connected in a way that’s all too rare in our modern world.”

**Features editors:** Joanna Hartmann, Hannah James, Georgie Torr

**Regular columnists:** Bruce Elder, Dr Karl Kruszelnicki AM, John Pickrell, Fred Watton AM, Kel Richards, Tim the Yowie Man, Peter Rowland

**More contributors:** Peter Blakeman, Elspeth Callender, Anthony Calvert, Sam Duncan, Angela Heathcote, Phil Jarratt, Jannico Kelk, Hamish Lindsay, Mandy McKesick, Christian Perez-Martinez, Bruce Newton, John Pickrell, Stephen Saphore, Jarrad Seng, Richard Smith, Andrew Tink, Jasmine Vink, Duade Paton



# SONY

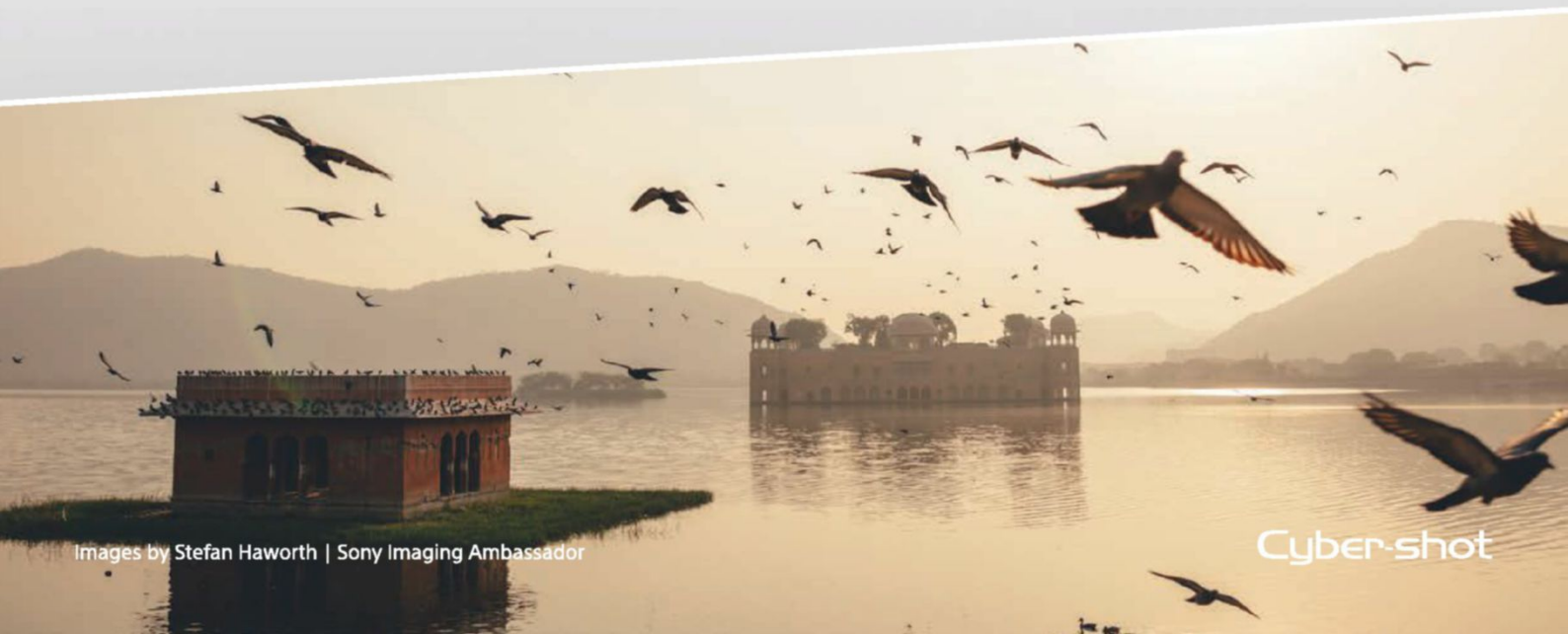


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# AG YOUR SAY



July • August 2019

## MAILBAG WELCOMES FEEDBACK

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## Featured Letter

### DOUBLE PLATYPUS FUN

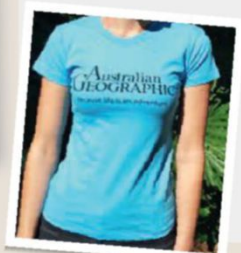
My seven-year-old son was very excited to see we had the first edition of AG that was being celebrated by the current one! He was so impressed, he made a

collage of our history of editions. What fun! It's always such a joy to share the new wonders of Australia with him each month.

**Amy Kilpatrick, Canberra, ACT**

### WRITE TO US!

Send us a great letter about AG or a relevant topic for the chance to be our featured letter and win an AG T-shirt.



fuel-reduction burns in the spinifex country. Hopefully, we may still be able to learn something from our past. Thanking you for our great magazine.

G.N. HEDDITCH,  
ECHUCA, VIC

### MOTHER OF INVENTION

In your Geobuzz page, AG 150, you wrote of the 'black box' flight recorder. Did you know that its inventor, David Warren, was the son of a CMS (Anglican Missionary) who died in the crash of a small plane between Victoria and Tasmania? It went down in Bass Strait and was never found. If you want details, check in the book *Dr No. 49*, written by his sister Grace Warren, a specialist hand surgeon who worked for The Leprosy Mission Australia for many years and, after retiring, at Royal Prince Alfred and Concord hospitals in Sydney.

PAT LAMBERT,  
ORIENT POINT, NSW

### SPOTTED, UP A TREE

I came upon your fundraising article on the spotted-tailed quoll and it brought back memories of an incident on my uncles' farm at Burrell Creek near Wingham, NSW, 44 years ago.

We had two bachelor uncles, Bob and Bert, who lived in the original Easton homestead on their own for many years. One was practical and to the point, while the other was an animal lover whose life revolved around animals. As we always did when on vacation in the area we took the children to visit the farm, and on this particular day we were greeted by a very distressed pair of uncles. The carcasses of 15 of their beautiful white leghorn chickens lay strewn around the chookyard, untouched apart from being totally drained of blood from small punctures in the neck. A conference was called! Bob decided it was a quoll.

Despite growing up in the bush I had never seen one and moved in closer to protect my two children.

### HIGH PRAISE

I thought I should write to you about the 150th AUSTRALIAN GEOGRAPHIC magazine. Wow! What a magnificent publication, I think it's one of the best issues ever. I read it from cover to cover. I particularly liked the poster, and I found the platypus article fascinating. I also really liked the high-quality map of the forest of Victoria's Central Highlands.

Please pass on my compliments to everyone involved. Nothing replaces hard work, and it's clear that lots of hard work went in to this issue.

DICK SMITH AC

### TRADITIONAL WISDOM

As a member since 1994 I was very pleased to receive my copy of AG 150.

I read with interest the article *Creating a super-park*. I also relate to Dr Karl's article in AG 146. We appear to have learnt little from the traditional owners of our country in relation to fuel-reduction burns. The more and larger parks we create will also bring on more bushfires. I'm old enough to remember both Black Friday in 1939 and many more since, including Black Saturday in 2009.

The report that followed the fire recommended fuel-reduction burns, but even these seem to have been reduced in size year on year.

I travelled to Darwin in 2016 and was interested to see where mosaic burns had been carried out north of the Adelaide River. In Broome, Aboriginal rangers carry out such

Bert's thoughts were that the animal would have looked for somewhere undercover to sleep off his big meal and so began a circuit of the run and, sure enough, on top of a shack covered by a wild tobacco bush was the said quoll.

It took off like a rocket straight up a huge Norfolk pine and my husband, as the youngest, was chosen to climb up and talk it into coming down quietly.

Not for Bob; he headed into the house for the 10-gauge shotgun and took up position at the base of the tree.

So there we were with Bert pleading for the animal's life while Bob demanded its demise.

My husband took a swing with a broom handle, striking the quoll above the eye, which only made it climb higher.

Without further ado Bob knelt, took aim and fired and down came the quoll. Dead!

That fine animal was admired by all. So strong and muscled with vicious teeth and an interesting spotted pattern.

The next time we visited, there was the quoll in pride of place on the mantelpiece above the fire. Bert had done a fine taxidermy

job complete with eye wound inflicted by my husband.

I know you may be horrified at this story but it was another era and a different time and 15 chooks were valuable, but I'm sure that Uncle Bert would have fully supported AG's quest to save this beautiful creature.

HEATHER CRAMP,  
WAGGA WAGGA, NSW

### BREEDING TIME

This interesting article, *The puzzle of the platypus*, AG 150, states that the Healesville Zoo and Taronga Zoo are the only two zoos worldwide to have successfully bred the species. David Fleay of West Burleigh in Queensland was the first to breed the species in captivity. I think it was in the 1940s.

ANDREW GALLAGHER,  
CURRUMBINVALLEY, QLD

### PHOTO CREDIT

Just wanted to say that you have some of the most beautiful photographs of this country – exceptional and breathtaking. All credit to the photographers.

CHRISTINE TIERNEY,  
RASMUSSEN, TOWNSVILLE, QLD

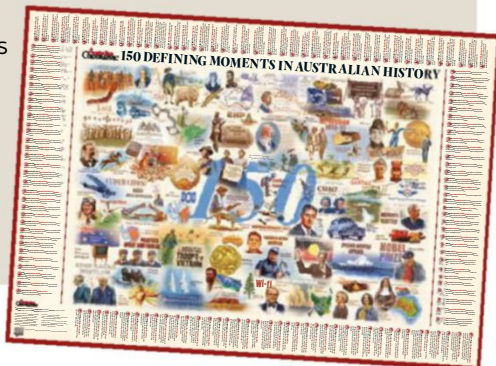
### FIRST NATIONS FIRST

This month's poster was fascinating and I enjoyed reading it. I do believe though that the time has come to stop glorifying some historic moments: European settlers didn't discover any place in Australia and were unlikely to have been the first people to cross the Blue Mountains or even the continent.

Similarly, no European is likely to have discovered a plant or animal that the first nations were not already familiar with.

The knowledge of Australia's traditional owners is undervalued by the importance placed on European explorers. If only they'd asked more questions instead of treating our country like an unknown land needing 'discovery'.

Jackie Steel, Coburg North, VIC



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Talkback



In April, we reported on some of the more  
unknown behaviours of magpies,  
including the fact that they basically  
have their own judicial system.  
Here's what you had to say.

DAVID ABBOTT

I've seen them standing in a circle around  
a dead one that just got hit by a car.  
They all had their heads up singing. It was  
early and cold and you could see the  
steam coming out of their mouths –  
so they have funerals too.

ALAN BURMAN

I saw a group of magpies 'holding court'  
earlier this year. At first, I thought it was a  
'union' meeting. But now I think I  
understand.

KARA PATON

I miss having magpies close by all the  
time because I now live in a heavily  
populated area. I love that magpies  
remember faces! So beautiful.

JOY WALFORD

We had a maggie with a really annoying,  
over-the-top whingey chick and one day  
the mum turned on it, knocked it over and  
jumped on its belly in an extreme  
tantrum. She then stalked off ruffling her  
feathers. It lay there for a while before  
getting up and chasing after her.









 Big picture

## Sun sign

By Steven Saphore

Infra-red images, such as this taken across Echo Point Lookout in the Blue Mountains, NSW, are critical for assessing vegetation health. Chlorophyll, the pigment in plant leaves, absorbs visible light but reflects light at near infra-red wavelengths, giving the forest here its snow-like appearance. Healthy plants with high chlorophyll levels remove carbon dioxide from the atmosphere through photosynthesis, which helps curb the warming of our planet.

As Australia becomes warmer and drier due to climate change, our vegetation will be increasingly important in helping maintain stable global temperatures.



# Solving an ecological mystery

Ancient Aboriginal knowledge is helping to fill in the missing details of epic migrations made by Australia's freshwater eel species.

Story by Angela Heathcote



**E**ACH AUTUMN, the adults of two species of Australian eel – the longfin and southern shortfin eel (*Anguilla reinhardtii* and *A. australis*) – prepare for an epic journey to a location thought to be in the Coral Sea between Papua New Guinea and New Caledonia, where they breed and then die.

Starting from estuaries, dams and rivers along eastern Australia as well as ponds and wetlands in urban enclaves, such as Centennial Park, in Sydney, and Melbourne's Royal Botanic Gardens, they can travel thousands of kilometres.

Navigating their way through drains and stormwater networks can be a game of chance.

"When they have the urge to migrate they are determined and pretty resilient," says ecologist Dr Jarod Lyon from the Victoria-based Arthur Rylah Institute for Environmental Research, which has carried out various studies on Australian eel populations since the 1970s. "Historically, they've been able to get past most barriers, as long as there's enough rain."

There's plenty we don't know about the migration of these eels. And much

of what we do know comes from anecdotal evidence of eel fishers.

At about the age of 25 years for longfins and 15 years for the shortfin species, they begin to move out of the freshwater systems where they've spent most of their lives, and turn a silvery colour. Following this transformation they head for the ocean, but after that it's largely a mystery.

"We know very little about how long it takes for them to get to their destination," Jarod says.

"It has been estimated to take somewhere between six and 18 months



As its common name suggests, Australia's longfin eel can be distinguished from our other freshwater eel species by its longer dorsal fin.

## At about the age of 25 years longfins begin to move out of the freshwater systems.

and they don't eat this entire time. We think they spawn somewhere between New Guinea and New Caledonia because fishing trawlers have picked up larval eels from this area."

Those larval eels would have been on their way to Australia, by way of the East Australian Current (EAC), which

distributes them along the east coast. "As they drift, they turn from larval eels into glass eels – basically, a fully formed juvenile eel but see-through," Jarod explains.

"Then they enter fresh water and that's where they pick up their pigmentation."



▲ **Justin O'Connor**, from the Arthur Rylah Institute, has his hands full with a slippery shortfin eel.



▲ **Many of Australia's** eels reach maturity and spend most of their lives in urbanised parklands along the east coast.

Knowledge about why the two different eel species settle where they do is limited. "We don't know why longfins stop at Western Port, south-east of Melbourne, and shortfins keep going all the way across to the Glenelg River, which runs through both Victoria and South Australia."

This is among many questions Jarod and his Arthur Rylah team are hoping to answer. The researchers are now working with the Gunditjmarra people of south-western Victoria to develop a better understanding of the eels' remarkable life cycle and their incredible journey, which has until now only been explained through educated guesswork.

The project is part of Biodiversity 2037, a Victorian state government initiative that aims to increase





**While travelling in the East Australian Current, tiny immature eels transform into juveniles known as glass eels.**

Aboriginal involvement in natural resource management.

“The Gunditjmarra people have this really strong cultural association with eels,” Jarod explains.

“They have efficient traps and have been farming them for thousands of years. The eels will be captured and fitted with saddle-like satellite and acoustic trackers. Each tracker will be set to record an individual eel’s movement for up to 18 months to create the very first full picture of their migration.”

JAROD IS KEEN to get his hands on this information, not just because it’s one of ecology’s big scientific questions but also because it will help future management of the eels, which may become difficult as a result of climate change.

“Eels of the Northern Hemisphere have declined by almost 90 per cent in the past decade, and that’s ‘our’ eels’ closest relative.

“Similar to the EAC, the Gulf Stream helps these northern eels travel to their spawning spots, and some scientists have speculated that the impact of climate change on the Gulf Stream is disturbing the eels’ migration.”

Jarod says we’ve already begun to see climate change affecting Australian eels. “They wait until a wet year to move through the stream or they can move over land in wet periods. If we have drier systems, the eels’ ability to move will be impacted.

“You can get large landlocked eels, which are usually the massive longfin ones. Those guys live to be well over 50 because they never make it to the spawning area.”



Tim the Yowie Man

## Can fish fall from the sky?

Spend any time travelling in outback Australia and it won't be long before someone tries to convince you they do.



**I**T SEEMS THAT just about every country pub has a barfly who remembers the day it ‘rained fish’.

The first time I heard of this phenomenon was in the 1990s at the Royal Mail Hotel in Hungerford in south-western Queensland, on the New South Wales border. There a local (yes, he was sober at the time) captivated the bar with a yarn about “the day it rained fish” in his home town.

“During the storm, I went outside and there were fish flapping around on previously parched paddocks,” he revealed. “The unsuspecting fish must have been plucked out of a dam or creek by a mini-tornado a long way away.”

Dr Peter Unmack, an ichthyologist at the Institute for Applied Ecology at the University of Canberra, has also encountered similar tales of fish falls in outback Australia.

“When I go out collecting fish in Central Australia, almost everywhere I go someone claims they’ve seen a rain of fish,” explains the self-confessed fish geek.

“The first thing I ask them is ‘how many fish did you find in your water tank?’” says Peter. “And the answer is always none. That’s because in almost all cases I believe the fish actually swam there.”

According to Peter, “When it rains hard the land can quickly become a shallow lake. And if you have enough overland flow, some fish can swim through it.”

Peter believes that most of the fish spotted after big rains in outback Australia fit the description of the spangled grunter (*Leiopotherapon unicolor*). It’s Australia’s most widespread small freshwater fish species, and is found in most waterbodies in the continent’s northern two-thirds. “They are extraordinarily good at dispersing with an ability to swim a kilometre or two in 20 minutes,” Peter says.

“In addition, spangled grunters are moderately capable jumpers, which also helps them overcome any small barriers,” Peter explains. “Their sudden appearance following rain once gave rise to folklore suggesting they were able to burrow and aestivate in dry mud, but to date this has never been documented.”

So, what about the tornado theory?

“To pick up a fish and move it in a storm is pretty challenging,” Peter says. “I’ve been on the other side of a dam when a big willy-willy has come across and there isn’t the slightest



bit of moisture in it. To pick up water and fish would take an extremely high velocity of wind.

“Even if a fully blown tornado was to form in outback Australia, anything caught up in it is going to have the hell beaten out of it,” Peter says. “The power in those things is ridiculous – there’s so much debris a fish would get pummelled by sand, twigs, dirt and more.”

Verdict: It is possible for fish to fall from the sky during a storm. But it is extremely unlikely, especially in Australia, where the types and intensities of tornadoes are not the same as those reported in some other parts of the world.

**NATURALIST, AUTHOR, BROADCASTER AND TOUR GUIDE** Tim the Yowie Man has dedicated the past 25 years to documenting Australia’s unusual natural phenomena. He’s the author of several books, including *Haunted and Mysterious Australia* (New Holland, 2018). Follow him on Facebook and Twitter: @TimYowie



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# Not pretty enough?

Nothing tugs at the heart strings quite like a cuddly koala or wombat joey, but few endangered species are this adorable. Most are far less charismatic...by human standards.

**W**hen it comes to threatened native species, it's usually our mammals that compete most successfully for our attention and funding. But for conservation to be effective, whole communities of plants and animals need protection. Unfortunately, many species miss out on vital support because they don't have the 'wow factor' to make people care enough to want to save them. Each state and territory has a huge list of threatened species: in New South Wales alone there are almost 1000. Shown here are some you might not know about, because they haven't been considered interesting or 'pretty' enough to grab the headlines. Others include the broad-toothed rat, Cumberland Plain land snail, plains wanderer and eastern bristlebird.

**Look out for future AG Society fundraising efforts for some of these precious species in upcoming editions of AUSTRALIAN GEOGRAPHIC.**

## Conservation status key:

- V** Vulnerable in NSW
- E** Endangered in NSW
- C** Critically endangered in NSW



### Southern myotis

Scientific name: *Myotis macropus*  
Conservation status: **V**

This flying mammal, Australia's only fishing bat species, hunts across streams and pools for insects and small fish by raking its large feet across the water surface. Microbats are important for managing insects.



### Spotted tree frog

Scientific name: *Litoria spenceri*  
Conservation status: **C**

Some frogs are stunning colours; then there's the spotted tree frog – brown and murky green. It's one of a growing number of Australian amphibian species facing an uncertain future due to the deadly chytrid fungus.



### Striped legless lizard

Scientific name: *Delma impar*  
Conservation status: **V**

The legs of these lizards have disappeared through evolution, which allows them to move with ease through grass. They squeak a warning to each other when threatened and can escape ground-dwelling predators by leaping (even without legs) 30cm into the air.



### Algae

Scientific name: *Nitella parooensis*  
Conservation status: **C**

People see the word algae and instantly lose interest. But this species is particularly special because it occurs only in a very small part of the claypan wetlands of north-western NSW and nowhere else in the world. It's a short-lived annual algae with roots and can grow up to 10cm high.

### Eastern curlew

Scientific name: *Numenius madagascariensis*  
Conservation status: **E**

This is a large wading bird with a long downward-curved black bill coloured pink at the base. It breeds in Russia and north-eastern China but most spend the non-breeding season in northern, eastern and south-eastern Australia, feeding mainly on crustaceans.

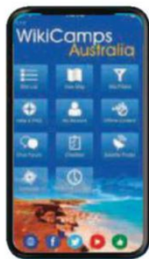
**The NSW Government is aiming to secure these and more than 900 other threatened species in NSW under its Saving our Species program. [savingourspecies@environment.nsw.gov.au](mailto:savingourspecies@environment.nsw.gov.au)**



**Download** ↓↓

## WikiCamps Australia

If you're looking for a place to stay, try this user-generated camping app, specifically designed for Australia. Its database is constantly growing and being updated by app users, with the latest information about sites across Australia. Listed locations include, caravan parks, campsites, hostels, day stops, points of interest and information centres. It also includes swimming and fishing spots, off-road driving, Wi-Fi hotspots, prices and more.



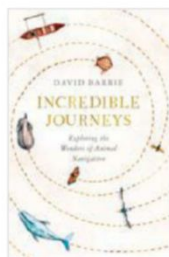
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takes us on a tour of animal navigation science. A stunning diversity of animal navigators use senses and skills we don't have. This book reveals these wonders.

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## *One Strange Rock*

Directed by American filmmaker Darren Aronofsky and narrated by actor Will Smith, this cinematic series brings Hollywood to the realm of natural history. In 10 hour-long episodes it explores the fragility and wonders of life on Earth as seen through the eyes of the only people to have left it behind – astronauts. It combines science with the perspectives of those who have observed our planet from both near and far.



# Making our Moon

**S**INCE THE APOLLO lunar landings of the 1960s and '70s, we have understood that the Moon was formed early in the Solar System's history as a result of something colliding with the Earth.

An earlier hypothesis that the Moon was an asteroid captured by our planet's gravity was discarded following the discovery that the lunar rock and soil samples returned by the Apollo astronauts have identical chemistry to those on Earth. The idea then became accepted that early Earth suffered an impact by an object about the size of Mars that ejected a massive plume of debris, which subsequently coalesced to form the Moon. So confident were planetary scientists of this scenario that they even gave the impacting object a name: Theia, after the mother of Selene (the Moon) in Greek mythology.

But there was a problem. In any random set of circumstances, the debris lifted by the collision would be composed mostly of material from Theia. And planetary scientists estimated that the chance of Theia having the same composition as the Earth was

▲ **Analysis of lunar rocks from the Apollo era suggest the Moon–Earth shared history may have been more violent than we thought.**

less than 1 per cent. More unlikely scenarios were then explored, including collisions at steep angles and very low velocities.

Now, a new theory seems set to solve the problem. Proposed by scientists in the USA and Japan, it postulates the collision occurred within the first 50 million years of the Earth's existence when its surface was an ocean of molten magma. Theia, being smaller, would have had a cooler, solid surface, and the theory suggests much less of its material would have gone into the Moon.

This idea neatly solves the problem of the Moon's Earth-like composition and also gives us new insight into conditions in the early Solar System.



**FRED WATSON**

is Australia's  
Astronomer-at-Large.

## FRED ANSWERS YOUR QUESTIONS

**Q:** Are there any 'lone stars' between the galaxies, and, if so, how common are they? Why are they not part of a galaxy themselves, if this is the case? Would there be exoplanets orbiting those lone stars?  
**Tim Burn, Adelaide, SA**

**A:** Yes, such stars do exist. They're known as intergalactic stars, and the first ones were discovered back in 1997 using the Hubble Space Telescope. They are thought to be relatively numerous, perhaps accounting for half the

stars in the Universe. They have probably been ejected from their parent star systems by galaxy collisions, or by encounters with the supermassive black holes at their centres. And they could, indeed, have their own orbiting planets.



# Traces

SA



## The Old Ghan line at William Creek, SA



The William Creek Hotel restaurant (see p106) is built from sleepers repurposed from the old railway track.

The Old Ghan bridge south of William Creek: relics of the old rail days are scattered around the William Creek campsite (left).



IF YOU'RE LUCKY enough to zip up through the Red Centre of Australia in the air-conditioned comfort of the sleek, silver modern Ghan, spare a thought for those who rattled along in its original namesake. The Old Ghan railway lies some 150km east of the modern line with its termite-proof concrete sleepers and state-of-the-art rolling stock, and while the modern Ghan keeps strictly to a published timetable, the Old Ghan was notoriously unreliable. Construction of the first track, The Great Northern Line, began in 1878 when a narrow-gauge line was laid between Port Augusta and Oodnadatta. The first service was known as the "Oodnadatta Night

Train" and it took another 50 years for the line to reach Alice Springs (then called Stuart). It became known as The 'Ghan, reputedly after the Afghan cameleers who plied a similar route on their equally temperamental ships of the desert.

The fortnightly service was unpredictable and plagued by washouts of sections of track, especially near the boggy shores of Lake Eyre. The line followed the north-south route established by explorer John McDouall Stuart in 1862 and was an epic engineering project. The southern segment passed through the Pichi Richi Pass to Quorn and today this section is a working rail museum. Restored steam trains run here on weekends

between March and November.

William Creek Station, 180km north-west of Marree, opened in 1885 and was an important watering and service point for the trains. You can visit a disused rail bridge just to the south of today's settlement and see other remnants displayed around the famous hotel and campsite, including its restaurant, which is built from old sleepers.

Modern diesel engines were less dependent on water and a new standard-gauge railway line was built along the more direct and dryer route from Tarcoola to Alice Springs. The last train on the old line left Alice Springs on 26 November 1980. In 2004 the new Ghan line was extended all the way to Darwin.



Oz words

By Kel Richards

## Aussie for food

There are a number of distinctively Aussie expressions for food. Most people will have heard of a "brown sandwich" – that's a bottle of beer. But what about a "seven-course meal" – that's a six-pack of beer and a meat pie. Also on that subject, there are all those delightful expressions for meat pie in Aussie English – such as a "rat coffin" or "maggot bag".

With the same display of exquisite good taste Aussie English has nick-

named the vanilla slice either a "snot block" or else a "phlegm sandwich". By the way, in both Perth and Brisbane sandwich shops you should order a "round" of sandwiches (a round being one sandwich). But in Tasmania that same sandwich would be called a "four pointer". And Aussie English has a nice description of someone who is a little too fond of their tucker: a fatty is called a "salad dodger".



NEED  
TO KNOW

with Dr Karl Kruszelnicki

## Do fish drink water?

IT WAS A DECEPTIVELY simple question from a listener to my weekly talkback show on Triple J: "Do fish drink water?" It's easiest to answer if we think of atoms and molecules. The chemical formula for water is  $H_2O$ . It's a molecule made from three atoms – two of hydrogen, one of oxygen – and it's shaped like a tiny boomerang.

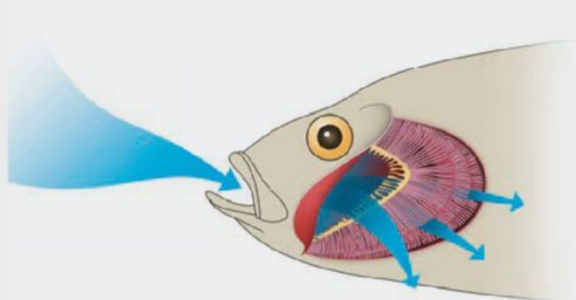
In any water body, such as a lake or river or the ocean, there are usually some oxygen molecules in between the water molecules – especially if the surface of the water is exposed to the air. Compared with water molecules there are many fewer oxygen molecules, which are each made of two atoms of oxygen and shaped like a barbell.

We humans drink water that goes into our gut, then our bloodstream and then our kidneys. Each day, the kidneys make a quantity of urine that's mostly water and equal to about 2–3 per cent of our body weight.

So, back to fish: all species 'drink', in the sense that they bring water into

their bodies to extract oxygen from it. A fish brings water into its mouth, and squirts it straight out – via its feathery gills (see image at right). Most of the water molecules go straight out. But oxygen molecules from between the water molecules can enter a fish's body via the gills, and then into the blood.

So all fish do 'drink' water to get their oxygen. But if you're talking about fish drinking water via the mouth–gut–bloodstream–kidney pathway? Well, some do, but it depends on where they live. Saltwater fish swallow water like crazy. But on the other hand, they make hardly any urine – only 4 per cent of their body weight each day. Due to osmosis, the rest of the water they swallow exits through their gills and skin, and into the salty ocean.



Freshwater fish do the opposite. They hardly drink any water but urinate massive amounts – about 20 per cent of their body weight each day. The water in their urine comes mostly from the fresh water they swim in. It enters their body straight through their gills and skin – again, due to osmosis. So, salties swallow the sea, while freshies fatten and wee.

**DR KARL** is a prolific broadcaster, author and Julius Sumner Miller fellow in the School of Physics at the University of Sydney. His latest book, *Vital Science*, is published by Pan Macmillan. Follow him on Twitter: @DoctorKarl

## AG podcast is go!

We've launched our brand-new podcast series, **Talking Australia**, featuring conversations with extraordinary Aussies from right around this magnificent country.



**F**ROM WILDLIFE warrior Terri Irwin (at left, with podcast host, AG editor Chrissie Goldrick) to a true legend of marine conservation, Valerie Taylor, and world record-breaking wingsuit pilot and medical doctor Dr Glenn Singleman, spend a little quality time in the company of some of our most inspiring Australians. Listen as they take you along on their personal journeys around this magnificent country and beyond, whether battling the elements to achieve their lifelong dreams of adventure or working hard to preserve our unique and fragile natural world and the creatures that inhabit it.



Each week the **Talking Australia** podcast features a new and lively conversation. Be sure to tune in.

**SUBSCRIBE TO TALKING AUSTRALIA** on iTunes, Spotify or from wherever you download your podcasts.



# Federation Drought

1895–1903: Australia's worst drought since European settlement

**T**HE FEDERATION DROUGHT affected almost all of Australia and is widely considered the most destructive in our recorded history, based on the huge stock losses it caused. So named because it coincided with Australia's Federation, the drought ended squatter-dominated pastoralism in New South Wales and Queensland.

By the end of the 1840s, about 280,000sq.km – almost all of eastern Australia – was occupied by at least 2000 squatters on Crown land.

To control them and encourage closer settlement, the eastern states introduced land reforms in the 1860s, hoping to break up large runs into smaller blocks for farming and grazing. This was not always achieved because squatters found ways to hold on to productive country. Nevertheless, many selectors took up 'homestead' blocks, in north-west Victoria's Mallee district in the 1870s, and from 1884 in the Western Division of NSW.

Meanwhile, expanding railways were enabling agricultural development, particularly wheat growing. Bores were sunk to access underground water, allowing stations to expand further into the semi-arid interior of NSW and central Queensland. At this time, most pastoralists carried high stock numbers, even in low rainfall areas. Sheep were cheap, water was available and graziers had saltbush and other scrub to provide quality feed when overgrazing destroyed perennial grasses.

Rabbits had been introduced to Victoria in 1859 and by the time drought set in they had reached plague proportions across most of south-eastern Australia. They dug up the roots of native bushes and ringbarked trees and shrubs. Between the rabbits,



**Buggies and sulkies in the dry bed of the Murray River during the Federation Drought.**

overstocking and drought, pastoralists had nothing left to feed livestock. With ground cover gone, exposed topsoil was lifted in huge dust storms, a feature of most droughts in Australia.

In 1892 the country had 106 million sheep. By 1903 the national flock had almost halved to 54 million. The nation lost more than 40 per cent of its cattle over the same period.

Drovers sought feed for hungry animals along travelling stock routes – the 'long paddock' – or moved them to pastures on the east coast and southern mountains with less dire conditions. Droving took an immense toll on sheep and cattle with losses of up to 70 per cent recorded. In 1902 newspapers reported that more than 2000 steers lay dead along Queensland's Goondiwindi–Miles route.

Pastoralists buckled under mounting costs of buying feed, controlling rabbits and repairing dust storm-damaged infrastructure. And, overwhelmed by debt, many graziers walked off their land. Some 20,000sq.km of leasehold country in the NSW Western Division

was reported to have been abandoned between 1891 and 1901.

No state government then had a formal drought-relief policy, and, despite royal commissions and inquiries, they were slow to consider practical measures. The NSW government declared a public holiday on 26 February 1902 for people to "unite in humiliation and prayer" for the end of the drought. Government offices and most businesses closed and religious services were held. The new federal government refused to reduce duties on fodder or provide other assistance. Drought relief was seen as a state responsibility, which didn't change until 1939 when the Commonwealth assisted Tasmania to recover from bushfires during another severe drought.

In October 1902 Melbourne's Lord Mayor opened a public appeal for Victoria's drought-affected areas and within a year attracted almost £19,000 (\$2.7 million today) and helped 1670 families. Sydney's Lord Mayor began a relief fund in January 1903 that collected just over £23,000 (\$3.3 million) in a year.

In the 1880s, many individual stations in NSW and Queensland were up to 3000sq.km and carried hundreds of thousands of merino sheep. By the drought's end, many huge stations had been resumed or foreclosed by banks, and, under further land reforms aimed at encouraging closer settlement and the development of agriculture, were partitioned and opened up to selectors.

Smaller properties and sheep flocks became the norm and mixed farming was widely adopted. It would be another 50 years before the national flock recovered to pre-Federation Drought numbers.



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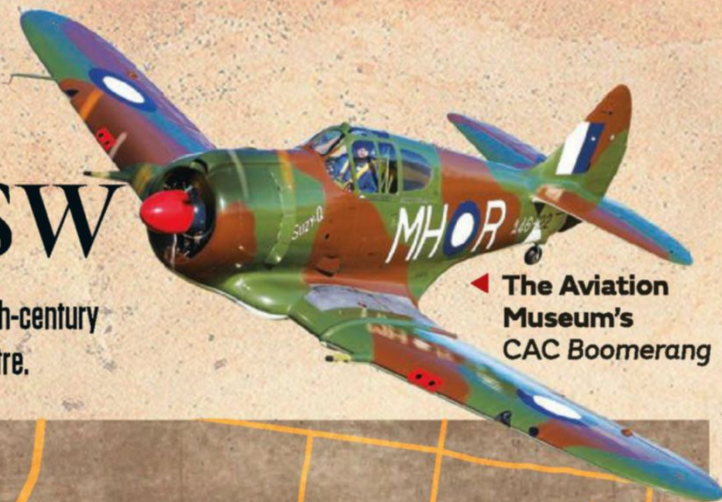
\*Conditions apply. SEE: [aptouring.com.au/SpecialDeals](https://aptouring.com.au/SpecialDeals) for full conditions. Price is based on per person (pp), AUD, twin share. Prices are correct as at 13 June 2019. Prices based on AFZ13: 26 May 2020. ALL OFFERS: Limited seats and offers on set departures are available and are subject to availability. DEPOSITS: A non-refundable deposit of \$3,000 pp is due within 7 days of booking. Australian Pacific Touring Pty Ltd. ABN 44 004 684 619. ATAS accreditation #A10825. APT-580



Bruce Elder's Aussie Towns

# Temora, NSW

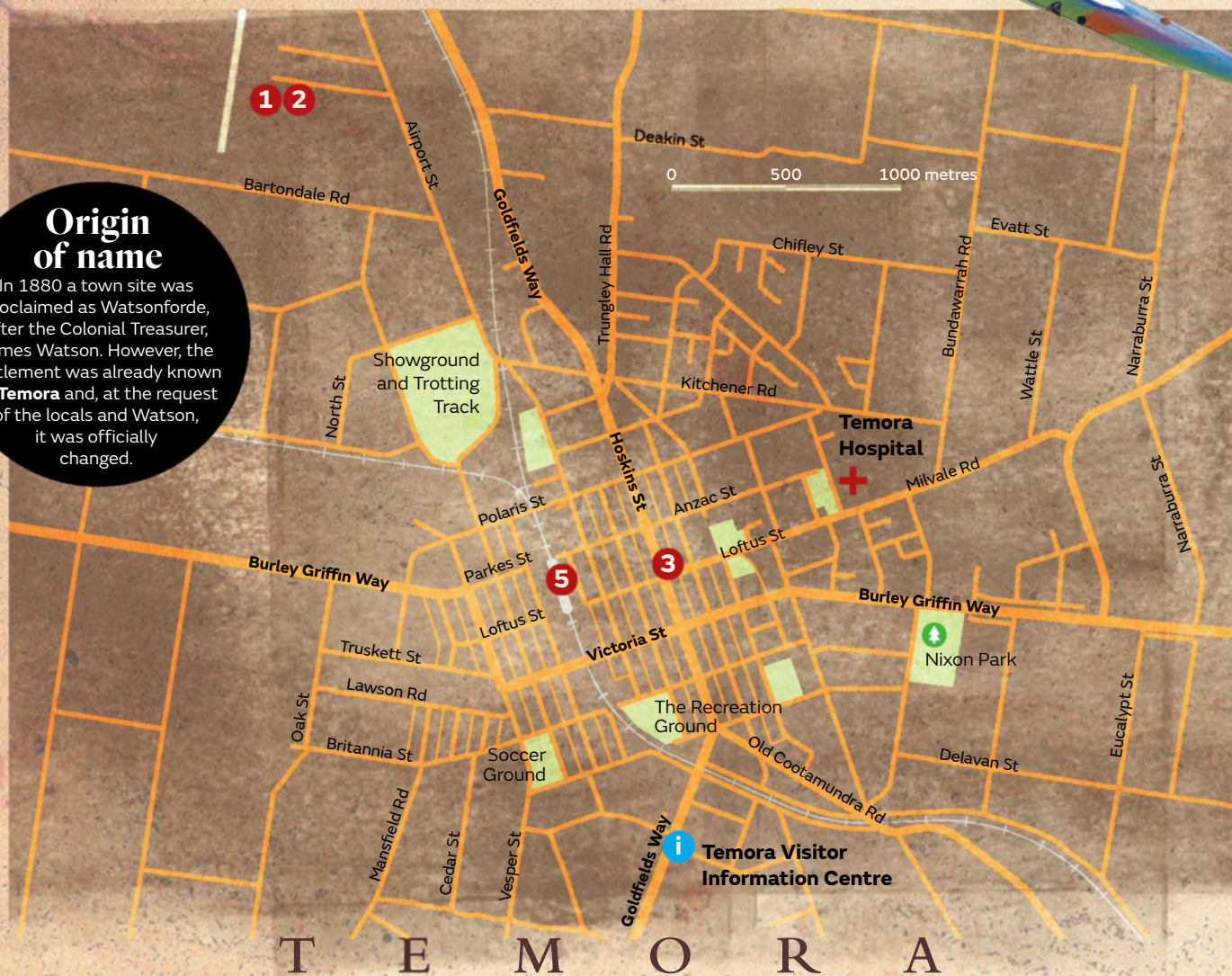
Located almost halfway between Sydney and Melbourne, this 19th-century gold-rush settlement continues today as a vital rural service centre.



◀ The Aviation Museum's CAC Boomerang

## Origin of name

In 1880 a town site was proclaimed as Watsonforde, after the Colonial Treasurer, James Watson. However, the settlement was already known as **Temora** and, at the request of the locals and Watson, it was officially changed.



**Temora** is 280m above sea level and located 423km south-west of Sydney via the Hume Motorway and Burley Griffin Way.



**T**EMORA DEVELOPED during the gold-rush era following the 1869 discovery of the precious metal there.

By 1881 the local goldfield was producing half the state's gold, and the town's population had passed 20,000, most of whom were miners. With the railway arriving in 1893, the town grew into an important rail centre, being in a prosperous wheat and sheep district. It has one of the state's largest inland grain storage terminals and a major agricultural research station. It's well known as a centre for harness racing with numerous trotting studs in the district. Today it's also famous for its outstanding Temora Aviation Museum and popular air shows, which occur regularly and provide an opportunity to see the museum's historic planes in flight.

## More information

Find the Temora Visitor Information Centre at 29 Junee Road or call 02 6980 1221. Visit [temora.com.au](http://temora.com.au) or [destinationnsw.com.au](http://destinationnsw.com.au)



# Things to see and do

## 1 Temora Aviation Museum

This facility was created and financed in 1999 by aviator and musician David Lowy, who aimed to create "an aviation museum dedicated to aircraft and pilots who had defended Australia". Temora's rich aviation history, enthusiastic local council, flat terrain and uncontrolled air space below 20,000 feet made it ideal. It's located at Temora Aerodrome, which was the base of Australia's largest RAAF Elementary Flying Training School, during World War II.

aviationmuseum.com.au



## 2 Temora Air Shows

Up to eight times a year the Aviation Museum has a flying weekend when many of its aircraft take to the sky. The shows are well organised and designed for both experts and novices. The demonstration flights program includes great commentary and pilot interviews. At the end of each flying day, barriers are taken down and spectators can walk onto the tarmac, talk to pilots and inspect planes. Gates open at 10am; the shows run from 10.30am to 4pm.

## 3 Statue of Paleface Adios

In Paleface Park on the corner of Hoskins and Loftus streets, a statue commemorates legendary harness racehorse Paleface Adios (aka The Temora Tornado). Born in 1969, he died in 1989 and won 108 races, helping to make Temora and the surrounding district a centre for Australian harness racing.



## Canola Trail

### 4 Canola Trail

An initiative shared between the shires of Coolamon, Junee and Temora, the Canola Trail is designed to offer a circular route between the three towns to highlight their local produce, unique railway history and natural attractions. You can find a useful downloadable map by visiting [canolatrail.com.au](http://canolatrail.com.au). This map resource includes suggested itineraries on the 151km route, which can be spread across one, two or three days.

### 5 Railway Museum

Located in Camp Street, the Temora Railway Museum is at the town's historic, and still operating, railway station. There is a Railway Walk with signage explaining the railway's history, and volunteers provide visitors with official tours. A highlight is the story of Boofhead, a black-and-white fox terrier (depicted in a statue at the museum) who, in the 1960s, rode the trains as far as Goulburn and Lake Cargelligo. The signage explains: "Boofhead had a likeable personality and it didn't take long for railway workers and the people of Temora to develop a strong affection for him... It was soon clear that he had a real passion for train travel and quickly became known as 'Temora's railway dog'."

Since 1988 Bruce Elder has travelled to every town in Australia. He has written more than 10 travel books including the Globetrotter Guides to Australia, Sydney and Queensland; 1015 Things to See and Do in Australia; and Explore Queensland and Explore NSW. He worked as a full-time travel writer with The Sydney Morning Herald and The Age from 1996 to 2012. Visit [aussietowns.com.au](http://aussietowns.com.au)

## Temora timeline

- ✦ The area is the traditional home of the Wiradjuri people.
- ✦ The 'Temora pastoral run' was established in 1847 by John Donald McCansh.
- ✦ Gold was first found in the Temora area in 1869.
- ✦ The main Temora gold rush commenced in 1879.
- ✦ In 1880 a town site was chosen, laid out and proclaimed.



- ✦ By 1881 the Temora goldfield was producing half of NSW's gold.
- ✦ The town's population reached 20,000 in the early 1880s. Mostly miners, they extracted a total of 4000kg from the district.
- ✦ The railway arrived in 1893 making Temora a vital wheat terminal.
- ✦ By the early 1900s, German farmers who had trekked from South Australia were settling in the surrounding area.
- ✦ Cattle saleyards and a butter factory opened in 1912.
- ✦ Temora Aerodrome was established in 1941 as an RAAF training school.
- ✦ In 1969 Paleface Adios, one of the greatest harness-racing horses ever bred in Australia, was born.
- ✦ The Temora Aviation Museum was opened in 2000.
- ✦ In 2016 the railway station was revitalised as a museum.





View

## Australian Geographic Nature Photographer of the Year exhibition

16 August–10 November  
South Australian Museum, Adelaide, SA

**E**XPLORE THE SUCCESSFUL entries from the 2019 Australian Geographic Nature Photographer of the Year competition in this prestigious exhibition at one of Australia's most highly regarded cultural institutions. Packed with stunning images of the natural world, the exhibition celebrates the unique bioregion that includes Australia, New Zealand, Antarctica and Papua New Guinea.

[naturephotographeroftheyear.com.au](http://naturephotographeroftheyear.com.au)



Explore

## Kakadu Bird Week

28 September–5 October,  
Kakadu National Park, NT

**H**OME TO MORE than one-third of Australia's avian species, Kakadu National Park is a bird-lover's paradise. Join traditional owners, Parks Australia and local birding specialists to celebrate the Top End's diverse birdlife, ranging from woodland species of the tropical savannah to waterbirds gracing the region's famed billabongs. Explore what the region has to offer while keeping an eye out for a multitude of species, from colourful finches to majestic birds of prey.

[parksaustralia.gov.au/kakadu](http://parksaustralia.gov.au/kakadu)

## looking up

with Glenn Dawes

Glenn Dawes is a co-author of the yearbook *Astronomy 2019 Australia* (Quasar Publishing).



**Naked eye**  
Perched high in the evening sky is Scorpius and Sagittarius, marking the Milky Way's central hub. A less obvious member of this group is Ophiuchus, the Serpent Bearer. Look near Antares for a dark region marked out by six faint stars arranged in a box shape.



**Binoculars**  
Where the 'tail' stars of Scorpius make a near 90° turn is an area rich in star fields. A great example is the open cluster NGC 6231, dominated by a dozen hot blue-white stars with three others nearby arranged in a distinctive equilateral triangle shape.



**Small telescope**  
The constellation of Sagittarius is home to many bright globular clusters. These massive 'cities' of stars don't all look the same – the stars in the core of Messier 75 are very dense; those in the brighter and larger Messier 22 are more loosely scattered.





Visit

## Mowanjum Festival

12 July from 2.30pm, Mowanjum Aboriginal Art & Culture Centre, near Derby, the Kimberley, WA

**T**HIS ANNUAL FESTIVAL celebrates the vibrant living culture of the Ngarinyin, Worrorra and Wunambal peoples who make up the Mowanjum community. It attracts visitors from all over Australia and is one of Western Australia's largest cultural celebrations. Performers of all ages participate in Junba, or traditional dances, that tell stories of the Mowanjum people. The revival and regular performance of these dances are significant and are deeply moving to the Elders who once thought they might never see them performed again.

[mowanjumarts.com/festival](http://mowanjumarts.com/festival)

Learn

## National Science Week: Extrasensory

10 August, 6pm–10pm, Parliament House, East Melbourne, VIC



**C**HALLENGE YOUR SENSES to work together in this extraordinary experience. Tune your ears, engage your nose, ready your tastebuds and flex your fingers in preparation for an evening

sure to be extra sensory. Listen to the music of elephants and then collaborate with a robot to create your own musical masterpiece. Feel your immune system at work as you sniff out bacteria and take a walk on a cell.

[scienceweek.net.au/extrasensory](http://scienceweek.net.au/extrasensory)

Visit

## Cairns Indigenous Art Fair

10–14 July, Cairns, QLD

**N**OW IN ITS 10th year, the Cairns Indigenous Art Fair continues to introduce innovative and exciting opportunities for Queensland Indigenous artists. Immerse yourself in the colourful and vibrant cultures and artistic wealth of Queensland Aboriginal and Torres Strait Islander Peoples through a three-day program of art, dance, music, talks and workshops. Art pieces are also available for purchase at the art market.



[ciaf.com.au](http://ciaf.com.au)

Look

## TastroFest – Tasmania's Astronomy Festival

1–3 August, Ulverstone Showground, Ulverstone, TAS

**T**ASMANIA HAS SOME of the cleanest and clearest skies in the world, and this three-day event is located in Ulverstone to capture a great view of the night sky and potential auroras. Attend beginner and advanced lectures and workshops on how to use different telescopes, classes in taking aurora photos and talks by special international guests. All are fixtures of this festival, which is designed to give different ages and levels of interest something to experience in our night sky.

[tastrofest.com](http://tastrofest.com)

Learn

## Planet Shark: Predator or Prey

Opens 6 July, Western Australian Maritime Museum, Fremantle, WA

**J**OURNEY THROUGH MILLIONS of years of evolution and immerse yourself in the incredible underwater world of sharks. This new exhibition will feature awe-inspiring models of real sharks on a scale never seen in Australia before, as well as a walk-through gallery showing stunning underwater imagery, an extraordinary collection of shark teeth and jaws, and extremely old and rare fossils – some up to 370 million years old.

[museum.wa.gov.au/museums/maritime](http://museum.wa.gov.au/museums/maritime)



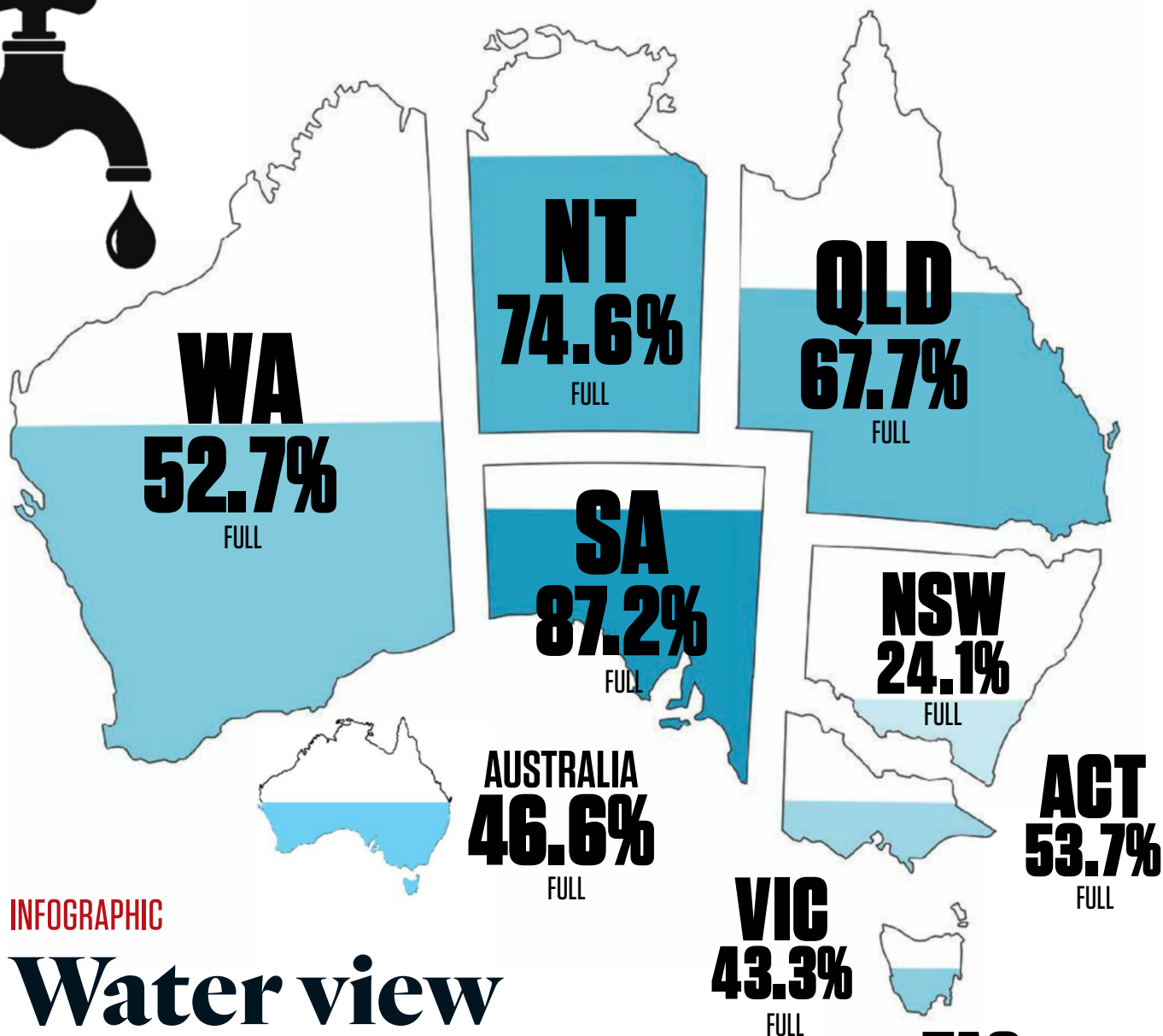
Enter

## Competition

WE'RE GIVING away three Echoes of Australian Fauna night parrot coins, valued at \$140 each. These coins are the third in a new series presented by the Royal Australian Mint: only 5000 of each coin will be produced. Made from nickel and decorated with gold-plated images of native animals, the coins will also be available to buy directly from the Royal Australian Mint in July.

Enter at: [australiangeographic.com.au/151](http://australiangeographic.com.au/151)





## INFOGRAPHIC

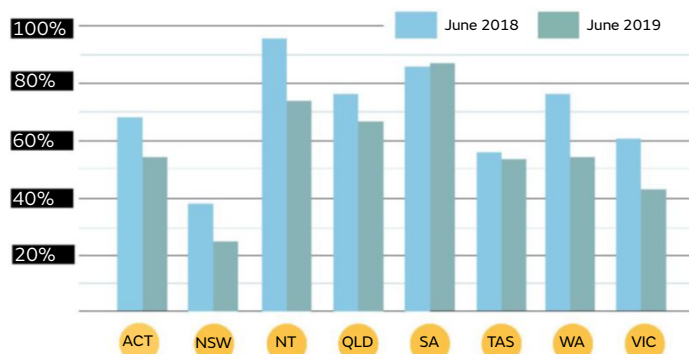
# Water view

**W**ATER MANAGEMENT authorities in each state and territory send water level data for more than 300 publicly owned lakes, reservoirs and weirs to the Bureau of Meteorology which standardises the information for easy comparison, both across the country and across time. This information helps inform forecasting and decision-making about management of valuable water resources and keeps the public well briefed, which in turn can influence individual behaviour.

It's obvious from a quick glance that, with the exception of South Australia, levels are lower across all states and territories than this time last year and overall, levels are at a three-year low. Tighter water restrictions have recently been introduced in New South Wales.

REPORTED DATE FOR ALL WATER LEVEL %  
12 JUNE 2019

## PERCENTAGE FULL BY STATE/TERRITORY



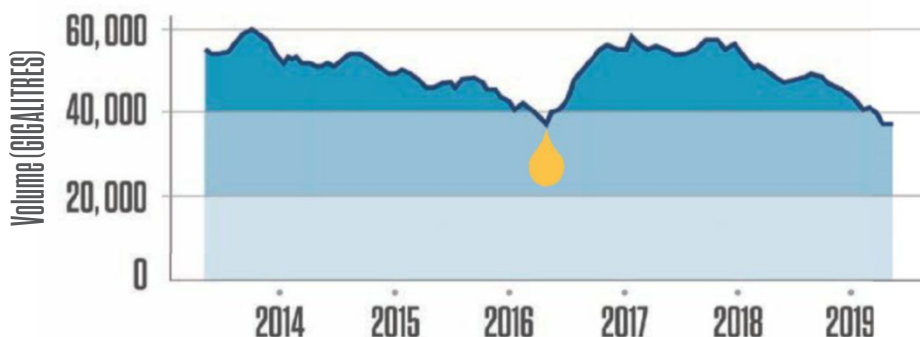


# FACT

Australia is the driest inhabited continent and has the highest per capita surface water storage capacity of any country in the world. The large number and size of water storages is a function of both Australia's aridity and its highly variable rainfall.

The last time the nation's accessible water storage was at a level similar to current figures was in mid-2016.

## Australia's accessible water by volume



## Water storage levels for our major cities

### SYDNEY

**52.9%**

1,364,892ML  
of 2,581,750

**70.1%**  
LAST YEAR

### MELBOURNE

**49.9%**

904,160ML  
of 1,812,175

**57.9%**  
LAST YEAR

### BRISBANE

**67.6%**

1,501,187ML  
of 2,220,150

**80.5%**  
LAST YEAR

### PERTH

**39.9%**

232,608ML  
of 583,537

**35.6%**  
LAST YEAR

### ADELAIDE

**42.3%**

83,538ML  
of 197,405

**46.5%**  
LAST YEAR

### HOBART

**75.7%**

2726ML  
of 3600

**78.5%**  
LAST YEAR

### CANBERRA

**57%**

158,489ML  
of 277,839

**69.6%**  
LAST YEAR

### DARWIN

**74.6%**

223,332ML  
of 299,409

**93.6%**  
LAST YEAR





July • August 2019

# Your Society

Australian Geographic Society news and events



Victor Vescovo.

## 2019 AUSTRALIAN GEOGRAPHIC SOCIETY GALA AWARDS NIGHT

**When:** Friday 1 November 2019  
from 6pm

**Where:** Shangri-La Hotel, Sydney

Book your tickets now at  
[australiangeographic.com.au/awards/](http://australiangeographic.com.au/awards/)

For more details see **page 39**

## Come and meet the world's deepest diver Victor Vescovo

**E**XPLORER, RETIRED naval officer and guest speaker at our 2019 AGS Gala Awards Night – Victor Vescovo – has broken the record for the world's deepest submersible dive. On 28 April, Victor made his solo dive to reach the deepest point on Earth: Challenger Deep at the bottom of the Mariana Trench (10,928m) in the Pacific Ocean. This was the deepest dive by

any human in history and is 16m deeper than any previous crewed dive.

It took 3.5 hours to reach the record-breaking depth in the 4.6m-long, 3.7m-high submersible DSV *Limiting Factor*, built to withstand the huge pressure of the deep (about the weight of 50 jumbo jets). Victor spent four hours there – the longest time spent on the deepest part of the ocean floor by a human.

This dive is part of Victor's Five Deeps Expedition, the world's first manned expedition to the deepest point in each of the five oceans. The next stop on this extraordinary feat will be Horizon Deep at the bottom of the Tonga Trench in the southern Pacific Ocean. Victor aims to be the first person to have reached the top of all the continents as well as the bottom of all the oceans. His final challenge will be to explore the bottom of Molloy Deep in the Arctic Ocean, which is currently scheduled for August 2019.

We look forward to having Victor as our guest speaker at the 2019 AGS Gala Awards Night.



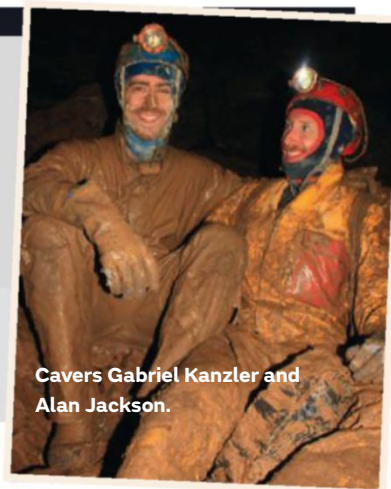
### ADVENTURE

## Another record-breaking dive

**A** TEAM OF AGS-sponsored explorers has set a new record for plumbing the depths of Australia's deepest cave, Niggly Cave, following it 395m down. The 10-caver team from Hobart's Southern Tasmanian Caverneers also found a connection between Niggly and the Growling Swallet cave system – which includes

Australia's fourth-deepest cave – under Mt Field National Park, north-west of Hobart. Expedition organiser Stephen Fordyce dived with scuba through more than 200m of unmapped, flooded cave passages to break the record. He said the greater achievement for all involved was connecting the two cave

systems, something attempted by cavers for decades. "One of Australia's most perplexing underground puzzles has been solved," he said. The caves are part of the Juneé-Florentine system, which is home to a labyrinth of at least 600 caves and more than 50km of underground passages.



Cavers Gabriel Kanzler and Alan Jackson.



# Australian GEOGRAPHIC PRESENTS

Come and be inspired. Part of the proceeds will be donated to the AGS.

Adelaide and Hobart will get the chance to hear from some of Australia's most impressive adventurers when the Australian Geographic Society Awards roadshow wheels into town in the coming months.

## Adelaide

1 August  
Mercury Cinema

Di Westaway  
Heather Swan  
Brigitte Muir OAM  
Kate Leeming

## Hobart

4 September  
Stanley Burbury Theatre  
UTAS

Eric Phillips OAM  
Michael Smith  
Justin & Lauren Jones

For more information and to book, head to

[australiangeographic.com.au/australian-geographic-presents](http://australiangeographic.com.au/australian-geographic-presents)

## Your subscription is essential to the Australian Geographic Society

EVERY SUBSCRIBER to this journal automatically becomes a member of the not-for-profit AG Society. Your subscription helps us fund Australia's scientists, conservationists, adventurers and explorers.

To subscribe, call  
1300 555 176

## Who are the Australian Geographic Society?

**Patron:** Dick Smith AC

**Chair:** David Haslingden

**Secretary:** Adrian Goss/  
Page Henty

**Directors:** Kerry Morrow,  
Jo Runciman

**Advisory Council:** Chrissie Goldrick, John Leece AM,  
Tim Jarvis AM, Anna Rose,  
Todd Tai

**Society administrator:**  
Nicola Conti

THE SOCIETY runs sponsorship rounds in April and November, during which it considers applications and disperses grants that are funded by the Australian Geographic business.

The Australian Geographic Society also awards the Nancy Bird Walton sponsorship for female adventurers and hosts annual awards for conservation and adventure. It runs fundraisers through AG retail stores. Each year it gives in excess of \$100,000 to worthy projects.

## On sale now

Tickets are now available for the 2019 Australian Geographic Society Gala Awards at the Shangri-La Hotel, Sydney, on **Friday 1 November**. Get your tickets at [australiangeographic.com.au/awards/](http://australiangeographic.com.au/awards/)



### ADVENTURE

## Exploring the spirit of Australia

AGS-sponsored photographer Ralph Alphonso has set off on his Asking for Directions expedition during which he will traverse Australia in a purpose-built four-wheel-drive

truck called Brutus. He plans to travel off the beaten track to experience a side of Australia that's rarely visited and rarely documented, capturing the spirit of this country through its people.

### CONSERVATION

## Dingoes in the Victorian Alps

The AGS has sponsored Dr Euan Ritchie and PhD candidate Eilysh Thompson of Deakin University to conduct a scientific project in the Victorian Alps examining how

dingoes affect feral deer and horse numbers and behaviour. They will also look at how this could in turn benefit sensitive alpine plants and animals.

Dingo ecology has been studied extensively in arid ecosystems, but there's much less understanding of their role in other regions, especially alpine environments.

Euan's field experiments so far suggest female deer may be more alert to dingo scent, but further work will continue to examine this and its potential ecological consequences.

## AG Society fundraiser HELP THE BRUSH-TAILED ROCK-WALLABY

This small wallaby is named for its long, flexible tail, which ends in a brush of coarse hair.

Once found across south-eastern Australia, the brush-tailed rock-wallaby was once widespread and abundant. Populations have declined dramatically, however, because of

predation by foxes and wild dogs, competition with feral goats and pigs, and the loss, degradation and fragmentation of habitat. It is now classified as vulnerable by the IUCN.



**MAKE A DIFFERENCE. PLEASE DONATE TODAY** Funds raised will help support the Friends of the Brush-Tailed Rock-Wallaby to protect rock-wallabies into the future. Visit [australiangeographic.com.au/fundraising](http://australiangeographic.com.au/fundraising) or call 02 9316 7214.



# Wild Australia

JULY · AUGUST 2019

Essential wildlife highlights that can't be missed

## Small but mighty

By Richard Smith

This view into the mini world of an amphipod living in an ascidian on a reef in Raja Ampat in Indonesia has been short-listed in this year's Australian Geographic Nature Photographer of the Year competition. "I was searching for miniature pygmy seahorses on the reefs of West Papua when I happened across this tiny amphipod crustacean," says photographer Richard Smith. "Just 0.5–1cm long, this male is sitting at the mouth of the sea squirt to guard the females and young within. According to an amphipod expert, this is likely a new species."





## SA SNORKEL WITH GIANT CUTTLEFISH, WHYALLA

**From June to August** the giant Australian cuttlefish forms huge breeding aggregations in Spencer Gulf, South Australia. Working in tandem with environmental authorities, the City of Whyalla is offering opportunities for guided snorkel tours from Stony Point, as part of its annual Cuttlefest: from \$99 for adults and \$49.50 for kids. **More info:** visit [whyalla.com/cuttlefest](http://whyalla.com/cuttlefest) or call Whyalla Visitor Centre on 08 8645 7900.

## WA SEE WILDFLOWERS IN BLOOM, KARIJINI NP

**By July–August** the Pilbara's wildflowers are blooming. Mulla mulla, Sturt's desert peas, numerous flowering acacias and native roses and hibiscuses can all be enjoyed in both Karijini and Millstream-Chichester national parks, as well as along roadsides. **More info:** call North West Tourism on 08 9193 6660 or visit [australiasnorthwest.com/page/pilbara-wildflowers-trail](http://australiasnorthwest.com/page/pilbara-wildflowers-trail)

## VIC SPOT A KOALA, OTWAY COAST

**Winter is a great time** to take a drive along Victoria's spectacular Great Ocean Road, and the Otway Coast hamlet of Kennett River is one of the best places in Australia to spot koalas. Turn into Grey River Road off the Great Ocean Road and 1.5km further on you are almost guaranteed to find them in the trees. Late afternoon is best.

**More info:** Call the visitor information centre at Apollo Bay on 03 5237 6529 or visit [greateoceanroad.org.au](http://greateoceanroad.org.au)

## Bird Nerd

with **Peter Rowland**



## ON THE BRINK

One of our most stunning honeyeater species is in desperate need of help if it is to survive in the wild.

**A**USTRALIAN HONEYEATERS come in all sizes, from the hulking yellow wattlebird, a Tasmanian endemic in which adult males are up to 46cm long, to the diminutive scarlet honeyeater of eastern Australia that grows to only about 9cm.

Along with the chats, our honeyeaters belong to the Meliphagidae, a widely distributed songbird family of about 180 species, 72 of which are found in Australia. Most feed primarily on nectar, which they sip from flowers using a specialised brush-tipped tongue. This energy-rich food source is supplemented by other sugary secretions from plants and insects, and a few species even feed mainly on insects.

Many honeyeater species are strongly linked to the ecosystems in which they live. An example is the regent honeyeater, which is found mainly in the box-ironbark forests of mainland south-east Australia, west of the Great Dividing Range. The species also occurs in dry open forests in coastal catchments, casuarina woodlands and adjacent gardens.

One previous widely used common name, the warty-faced honeyeater, describes the wrinkled patch of yellowish facial skin around its eye. The species' plumage is striking. It has a distinctive black hood; black body feathers broadly edged with white, giving a scalloped appearance; and bright-yellow panels in the feathers of the wings and tail.

Historically, the regent honeyeater's range extended from around Adelaide, South Australia, north to Rockhampton in central eastern Queensland. But it is

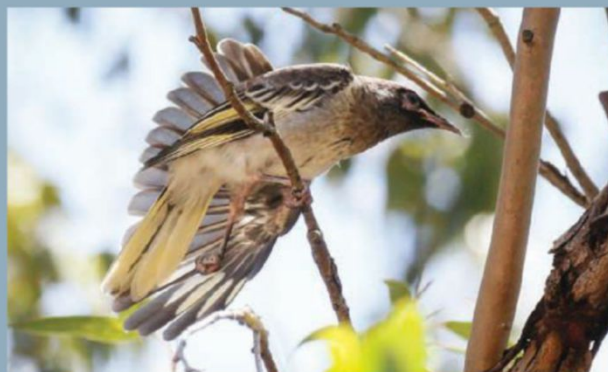
no longer found in South Australia or western Victoria. Today the species is most abundant in Capertee Valley, the Hunter Valley and central coast of New South Wales, and around Chiltern in Victoria. It is strongly nomadic, following the flowering blossoms of eucalypts and mistletoe.

Sadly, the regent honeyeater is now critically endangered: loss, fragmentation and degradation of its habitat and competition from other species are among key threats. But fortunately, several organisations, including Birdlife Australia and the NSW government through its Saving our Species (SoS) program are taking action to help this embattled little bird. Captive breeding and release programs have been underway since 2008 and biannual (May and August) regent honeyeater surveys have been undertaken by Birdlife for more than 20 years.

About 400 mature birds are thought to remain in the wild, although only 94 individuals were reported in 2018 and just 30 up to the end of May this year. More alarming is that the only breeding site found last year, which is near Cessnock in NSW, is at risk of being lost to industrial development.

Birdlife and SoS rely heavily on volunteers to undertake counts and other activities, such as tree planting to increase the species' habitat and re-establish essential wildlife corridors. See [birdlife.org.au](http://birdlife.org.au) to find out more.

If you're lucky enough to see a regent honeyeater in the wild, please note any coloured leg band it might be wearing and inform Birdlife of your sighting.



◀ **The critically endangered regent honeyeater now occurs in only a fraction of its original range.**

**FOLLOW** Peter on Twitter: [@\\_peterrowland](https://twitter.com/_peterrowland) and Instagram: [\\_peterrowland](https://www.instagram.com/_peterrowland)

## NATURE

# A fish-eye perspective

Strange visual systems not seen in any other animals have evolved in deep-sea fishes.



**V**ERY LITTLE surface light penetrates ocean depths. Even at just 100m down in clear tropical water, only 1 per cent of the visible light spectrum

penetrates and most of it is blue.

Because of this, it used to be thought that deep-sea fish species, living below about 1500m, are colourblind.

But the Sun is not the only source of light in ocean waters. Recent research suggests many sources of bioluminescence – including jellyfish, anglerfish and microorganisms – could explain why some deep-sea fish species seem to have surprisingly excellent colour vision.

The eyes of vertebrates (fishes, amphibians, mammals, birds and reptiles) have two kinds of cells – called cones and rods – containing light-sensitive pigments (photopigments) known as opsins.

Cone cells have up to four types of opsins that detect different colours, typically in bright conditions. Rod cells are much more sensitive to light and dark contrast and can detect very low light levels. However, about 99 per cent of vertebrates, including humans, have rod opsins that come in only one type and can't be used to detect different wavelengths of light and therefore colour.

Humans have cone cells that detect wavelengths of red, green and blue light, allowing us to see in colour during the day. Our rod cells allow us to distinguish shapes and contrasting patterns in very dark conditions.

Now an international team that included University of Queensland (UQ) scientists has carried out a new DNA analysis of genes that produce



**These deep-sea fishes** are now known to have enhanced vision: (top to bottom) the silver spinyfin, lanternfish and a tube-eye.

rod opsins in 101 different deep-sea fish species and they've made a very surprising discovery.

They found a number of different types of rod opsins in 13 of those species, such as the tube-eye (*Stylephorus chordatus*) and lantern fishes (*Benthosema* sp.). And they found a staggering 38 rod opsins in one species, the silver spinyfin (*Dirotmus argenteus*), making it the vertebrate with the greatest number of photopigments yet detected.

The rod opsins in that species “cover the range of [wavelengths of] the residual daylight, as well as the bioluminescence spectrum present in the deep sea”, the authors explained in the journal *Science* in May. What this suggests is that fish in an environment where bioluminescence produced by other creatures is the major source

of light have evolved special adaptations in their eyes to be able to discriminate between light coming from different animals.

“There are many colours of bioluminescence down there, and it mainly appears in flashes,” Dr Fabio Cortesi, a lead author of the study and a researcher at UQ's Queensland Brain Institute, told reporters, adding that “[deep-sea fish species] might have evolved specific behaviours hard-wired to different colours. If you want to survive down there you need to quickly decide if you want to avoid being eaten or eat what you see.”

Because deep-sea fishes can't survive at surface pressures and temperatures, it's almost impossible to test the findings behaviourally. However, analyses of the complete sets of genes – the genomes – of these fish species have been cleverly used in this case to make inferences about the systems of vision they have at depth.

Intriguingly, the species found to have a range of rod photopigments in their eyes are not all close relatives, and some may be on evolutionary lineages that split more than 100 million years ago. This means that this unusual system of vision has evolved separately in the deep sea on a number of occasions.

Before this new study, most students would have learnt in school biology classes that cones are responsible for colour vision and rods are responsible for detecting brightness or contrast in dim conditions. This surprising finding has revealed this might not always be the case.

**JOHN PICKRELL**

is a former AUSTRALIAN GEOGRAPHIC editor. Follow him on Twitter: @john\_pickrell



# 2019 AUSTRALIAN GEOGRAPHIC SOCIETY GALA AWARDS DINNER



## You're invited

To our ever-popular AGS awards night to hear inspiring stories of our 2019 award winners and meet Victor L. Vescovo, the man who recently dived to the bottom of the Mariana Trench. With Ray Martin as emcee, it's bound to be a memorable evening. Last year's event was a sell out, so book early and don't miss it.



Victor L. Vescovo



Ray Martin

**When** Friday, 1 November 2019 from 6pm **Where** Shangri-La Hotel, Sydney  
Tickets from \$225. Includes three-course dinner with beer and wine.

**Book now at** [australiangeographic.com.au/awards/](http://australiangeographic.com.au/awards/)  
email [society@ausgeo.com.au](mailto:society@ausgeo.com.au) with enquiries







# Frill seekers

**Scientists are discovering why our  
frillneck lizard has one of the animal  
world's most dramatic displays.**

---

STORY BY JOHN PICKRELL





A female frilly flashes a near-perfect neck ornament in a display these lizards are thought to use when they feel threatened.





**This paler lizard is from Broome** in northern WA. Diet and genetics may affect colour variations across the species' range.

**I**T'S MOSTLY BLUFF and bluster, but a frillneck lizard's display when it's disturbed can still be surprisingly intimidating. Open-mouthed, with its dinner plate-sized, bright-red frill erected around its neck like a scaly umbrella, a 'frilly' lunges and hisses at biologist Christian Alessandro Perez-Martinez at Fogg Dam Conservation Reserve, on the Adelaide and Mary river floodplains in the Northern Territory.

Between lunges, it sways back and forth and makes loud cracking sounds by whipping its tail. Eventually, it turns and scampers off on its hind limbs to scramble up the nearest tree. "This dramatic performance aims to deter predators, or at least momentarily overwhelm them, so that the frillies can escape," Christian says. "Even though frillies aren't dangerous to humans, their behaviour definitely makes you think twice."

Christian is a visiting researcher in The Lizard Lab at Macquarie University, Sydney, where he's been working in collaboration with Associate Professor Martin Whiting. He's been carrying out some of the first field research on these enigmatic lizards, which are common across the tropical savannah and woodlands of northern Australia and New Guinea. Although an adult male here is rarely bigger than 75cm in length and 750g in weight, collecting the data Christian needed on the lizards' colour and anatomy was more difficult than he expected it to be.

"The frillies would constantly lock eyes with me and frill up, and on several occasions managed to get a good tail-whip to my face," he says.

Christian's work has involved finding frillnecks asleep at night in eucalypt canopies. During 120 days in late 2017 and early 2018, he carefully captured 53 animals to run behavioural trials in an enclosure, where he recorded the lizards' responses to models of predators, hoping to figure out, once and for all, precisely how their display works.

**I**T MAY SEEM obvious that the display is to scare predators, but until Christian's study, no-one had properly investigated how it works in the wild. Indeed, when scientists first turned their attentions to frillneck behaviour about three decades ago there were many outlandish suggestions about the frill's purpose.

"[It's] the largest and most dramatic display structure seen in any reptile," says University of Sydney reptile expert Professor Rick Shine, who was the first to conduct a detailed field study of frillneck ecology and behaviour. In the mid-1980s, he spent 300 hours observing the species in Kakadu National Park, east of Darwin (see AG 28). Before that, there wasn't a single scientific paper on frillneck biology, although there were many colourful explanations for the frill's purpose.

"Different theories on the evolution of the frill have been thrown around for decades," Christian explains. "It was initially hypothesised that the frill might be used by lizards to parachute down from the canopy, but this theory and others, such as a role in thermoregulation [body temperature control], don't appear to hold true."



**Frillnecks** are large lizards, adults often growing longer than 80cm, including the tail. The frill is carried flat, as this one is, until needed.



## “It’s the largest and most dramatic display structure seen in any reptile.”

Between the 1880s and 1930s, various naturalists proposed not only that the frill might be used for warming and cooling, or gliding down from trees, but also for food storage, amplifying distant sounds or attracting mates. Rick showed that two common theories, relating to predator deterrence and social interaction, did appear to hold true. He found that adult males were heavier, had proportionately larger frills than females and displayed more often than females and juvenile males. It suggested the frill played a role in competition between males by warning rivals off from entering a male’s territory, which is roughly 2ha.

Frillies are agamids – members of family Agamidae, which are commonly known as dragons. These typically have complex social interactions, communicating with each other using behaviours such as head-nods, arm-waves and push-ups. They tend to pick elevated sites to display to each other. “The frilly has just taken that to a whole other level,” Rick says. “They’re one extreme of a very persistent theme within the dragons, which is that they’re very territorial and use vision to communicate.”

In Kakadu, at least, frillnecks prefer open woodland with small trees, where they can perch on a branch a metre or so from the ground. “A male can sit on his tree and, if he starts slapping his tail and doing push-ups and flapping the frill, it’s visible for a prolonged distance to another male who’s got terrific eyesight,” Rick says.

**T**HE COLOUR OF the lizard’s frill is another topic that has interested researchers. “It has been known for some time that there’s variation in frill colour across their range, going from red in the west, grading from orange in the NT, and yellow in northern Queensland and New Guinea, to whiter in southern Queensland,” says Dr Mitzy Pepper, who studies evolutionary relationships among reptiles at the Australian National University, in Canberra.

Mitzy led a team that looked at the DNA of 83 frillnecks from across the species’ range to see if colour differences were ►

## Frilly facts



▲ This tiny hatchling is yet to develop the full frill or colouration seen in adult frillnecks.

### COMMON NAME

There is no generally agreed upon common name. Among those widely used are frillneck lizard, frilled lizard, frilled dragon and frill-necked lizard – all of which are often shortened to frillie. The species is known as the bemmung to the Gagadju people of the Kakadu region.

### SCIENTIFIC NAME

*Chlamydosaurus kingii*  
(King’s cloaked lizard)

### WEIGHT

Typically 500–750g, but the heaviest individual Christian has caught weighed 840g.

### LENGTH

70–95cm, including tail

### BREEDING

Mating takes place in September. Females lay clutches of 8–20 eggs in November and hatchlings emerge about February; the temperature at which eggs are incubated determines the hatchlings’ gender.

### DIET

Mostly insects and other invertebrates; occasionally small vertebrates

### ABORIGINAL RECORD

Gurndamen, the frillneck lizard, is a Dreaming figure of the Gunwinku people of Gunbalanja (Oenpelli) in north-western Arnhem Land.



Frillneck distribution



▲ Like other dragons, frillnecks prefer to display from elevated spots such as termite mounds, as seen here in northern QLD.

linked to significant genetic variations. “It was unknown if these different colour variations might also be genetically distinct, and whether or not we had more than one species,” she says. The results, published in 2017, showed frillnecks can be separated into three different genetic groups with slightly different DNA. These are consistent with different frill colour, but not genetically different enough to be separate species. Mitzy believes this is because different populations have remained well connected in recent evolutionary history, helped by the land bridge that connected northern Australia and New Guinea 18,000 years ago, when sea levels were lower and savannah stretched across the Torres Strait. “This was a very interesting result,” she says, “because there are countless examples of other lizards with very deep genetic divergences across this part of Australia.”

Claire McLean, in the Devi Stuart-Fox lab at Melbourne University, has been exploring the physiology behind this and how frillnecks produce the pigments behind their colour. Both red and yellow pigments are carotenoids: frillnecks acquire these from their insect diet and concentrate them in their skin. This implies frillnecks with brighter frills are healthier and stronger, with better diets, than those with less vividly coloured frills.

Red carotenoids, such as those that give flamingos pink plumage, often come from shrimps or algae. “This is particularly interesting, because red carotenoids are rare in the diet of frillnecks,” Claire says. Instead, frillnecks are thought to be able to convert yellow carotenoids in their diet to red carotenoids in their skin. “Because it’s costly to produce skin colour using red carotenoids, it’s thought this could be an honest signal of an individual’s quality,” Claire says, explaining that redder individuals are likely to be more fearsome competitors and better mates. Her work now aims to understand the genetic basis of how the different pigments are produced.

## The species’ ability to walk at a leisurely pace on its hind legs particularly appeals to him.

THE FOCUS OF Christian’s research has been how the sudden erection of the frill, and the behaviours that go with that, can be used to frighten off predators. “We’re still in the data-analysis phase, but it seems that the defensive behaviour is what we would expect from a deimatic display,” he says.


Deimatic displays are typically used by reptiles as a last line of defence against an attacking predator (see *Wild Australia*, AG 146), intended to startle and confuse an attacker. To this end, they are often swift, highly conspicuous and over quickly. They’re mostly bluff, but work well against predators that depend on the element of surprise to catch prey, such as birds and snakes.

Currently based in the USA, Christian is planning to return to Australia for more fieldwork, this time measuring the reactions to the lizards’ display of predators such as hawks. “This could ultimately break down the deimatic display, to see what elements are effectively broadcasted to stall or halt the incoming threat,” he says.

Rick looks back fondly on his work on frillies during the 1980s, and often still encounters them during fieldwork on other species. The species’ ability to walk at a leisurely pace on its hind legs particularly appeals to him. “One of the lizards I was watching, on a little tree, saw a beetle walking past. He scurried down to the ground and grabbed it,” he says. “But the bit that astonished me was that, as soon as he got back to the base of the tree, he reared back and walked across on his hind legs. Very few animals do that, and it’s hilarious.”

While many lizards run on their hind legs, they need to get up a fair speed to do so. Rick speculates that because frillies have evolved such a long neck to accommodate the frill, they can lean back and get it into such a position that they are unusually stable on their hind legs.

For many years, numbers of frillneck lizards have seemed relatively secure and the species’ IUCN (International Union for Conservation of Nature) threatened status is currently listed as ‘least concern’. However, Rick says that recently there has been evidence of worrying declines across parts of the species’ range. The cause is currently one of the most important unanswered questions about the species. Rick thinks changing fire regimes and vegetation communities, driven by the spread of invasive grasses that burn very intensely, could be part of the problem, but there have also been reports of frillnecks dying after eating cane toads.

For Christian, observing a frillneck in the wild in the NT for the first time was an emotional experience. “They are quite charismatic, extremely aware of their surroundings and quick to perceive any movement or sound,” he says. “Since I was very young, I’ve wanted to encounter a frilly in the wild. It is a childhood dream come true to conduct research on these iconic dragons and come to know individual frillies so intimately.” 



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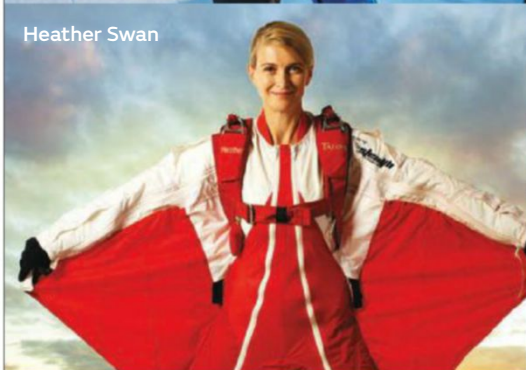
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**Brothers Larry (at far left) and Peter Perkins** with some of the items from Barclay's missing cache that they found in the Simpson Desert and unearthed during an excavation of the site. Included here are water containers, ammunition, cooking pots and pans, hand tools and even a stirrup.







# Finding Barclay's treasure

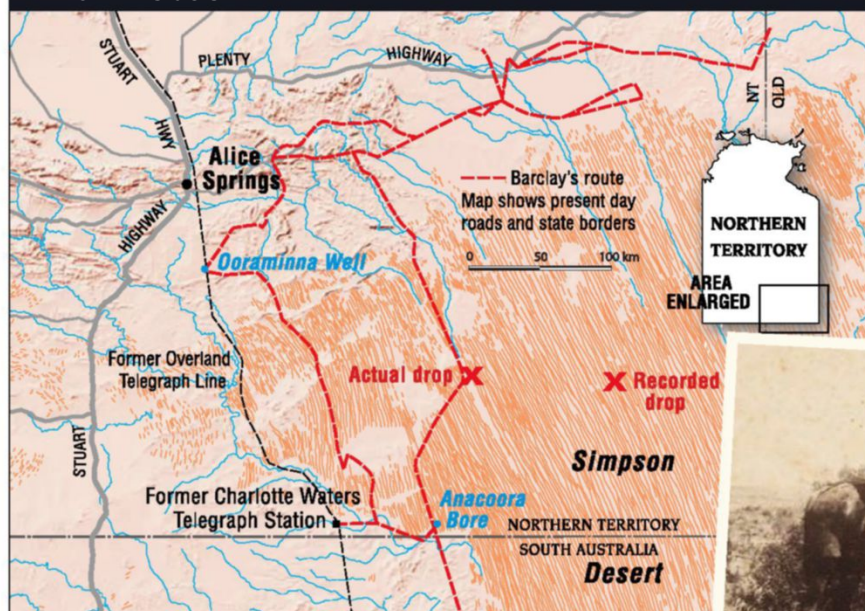
Retired motor-racing legend  
Larry Perkins solves a 100-year  
mystery in the desert.

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STORY BY BRUCE NEWTON  
PHOTOGRAPHY BY PETER BLAKEMAN



## BARCLAY'S JOURNEY



Larry Perkins (above) in a BRM in early 1977, during his Formula 1 career. Captain Henry Vere Barclay (left) used a different kind of horsepower a century earlier.



**A**FTER AUSSIE RACING LEGEND Larry Perkins became interested in the outback story of Captain Henry Vere Barclay and his missing cache of equipment, it was only a matter of time before the mystery was solved.

Larry, who raced in Formula 1 in the mid-1970s and won the Bathurst 1000 six times in the 1980s and '90s, has a reputation for logical thinking, a mechanically brilliant mind and a fair degree of bush-bred cunning. After he finished his racing career in 2003 he became intrigued by the Henry Barclay legend.

Retiring brought Larry back to the bush, back to his beginnings. Born in the desert country of north-western Victoria and raised on a farm at Cowangie, going outback once he stopped racing was as logical and natural to him as breathing. He started following the trails of our early explorers, and in 2016, when he heard the story of Barclay's missing cache, it became an irresistible challenge for him.

**B**ORN IN LANCASHIRE IN 1845, Barclay came to Australia with the Royal Marines as a surveyor in 1863. In July 1904 he left Oodnadatta in South Australia as head of an expedition charged with: accurately mapping the Anacoora Bore on the edge of the Simpson Desert; identifying a viable stock route to Birdsville in Queensland; and searching for evidence of the fate of Ludwig Leichhardt, the German explorer who vanished somewhere in the outback in 1848 (see AG 1 and AG 150).

Barclay and his team nearly fell foul of the outback themselves. Within four months they were deep in the Simpson Desert's endless waves of sand and temperatures were arcing well above the old 100° Fahrenheit mark (38°C). We know this because of the detailed diary kept by the expedition's second-in-command and part-funder, South African Ronald MacPherson.

Running out of water and faced with a five-night (it was too hot to travel by day) trip back to Anacoora Bore, the expedition dumped any gear that was not absolutely essential for survival. There were hundreds of kilograms of it, ranging from

water barrels to bullets. MacPherson's diary recorded exactly what was left.

The expedition eventually made it safely back to civilisation and Barclay returned to the desert in 1905, but never collected the gear he left neatly stacked in the lee of a sand dune. Plenty of others have since gone out in search of Barclay's discarded equipment. The first recorded formal attempt was in 1915. Another was in 2013. And there have been plenty of informal searches as well. None had been successful until Larry Perkins came along.

**T**HE FUNDAMENTAL PROBLEM was the location given in longitude and latitude by MacPherson in his diary. Go to that spot and there's certainly no cache, nothing but sand and spinifex.

"It just didn't add up," explains Larry, who believes Barclay has not been well known to many Australians because he neither found anything of significance nor died while exploring. And yet the mystery intrigued him.

Late in 2017, Larry travelled to Adelaide to spend a week at the Royal Geographic Society of SA reading MacPherson's diary and Barclay's 1905 report of his two expeditions.

He looked at the maps, meticulously examined the routes and the conditions, traced their daily positions and came to the logical conclusion that the longitude and latitude where everyone had searched were incorrect. People were looking in the wrong place.

"So MacPherson made a mistake?" I ask. Larry flashes a cunning smile before answering. "They weren't silly. The error has enormous logic to it."

At the time the diary was written, MacPherson and Barclay had every intention of going back to collect their abandoned equipment. We don't know why they didn't, but if you follow Larry's logic they certainly came up with a plan that fooled all treasure hunters for more than a century.

Larry did his own calculations and came up with the spot on the map that he thought made sense for the cache to be,

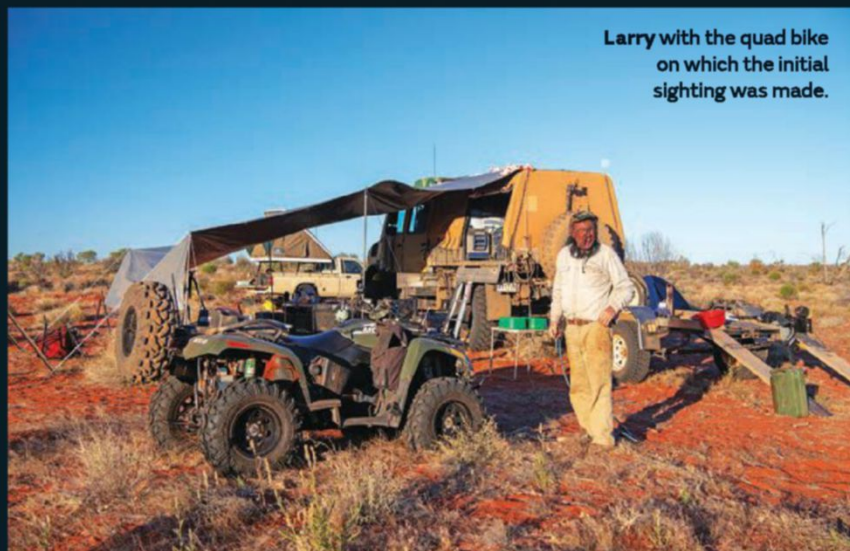




Larry (at right) and his mate Jim Kurtin take time out from excavations during Larry's third trip to the site of Barclay's treasure.

**Larry has a reputation for logical thinking, a mechanically brilliant mind and a fair degree of bush-bred cunning.**

► The purpose of these brass nibs with loose steel pins, which were found during the digs, remains a puzzle to Larry.



Larry with the quad bike on which the initial sighting was made.



▲ Does anyone know what this is? It's a solid white object found among the items at the dig site that is yet to be identified.



**Being only partly buried** at the site of the find, this reinforced soda bottle was one of the first items spotted during the brothers' first trip there.



about 100km west of MacPherson's published location and south of the Madigan Line – the course of the first European crossing, using camels, of the Simpson Desert by Cecil Madigan in 1939.

In May last year Larry called his brother Peter and the pair headed for the Simpson in Larry's yellow Unimog – an all-wheel-drive Daimler truck that's an impressive bit of kit, thoroughly reworked for comfortable outback travel. It carries a double bed, kitchen and shower and pulls a quad bike on a trailer. There have been plenty of times Larry's hooked up a stuck 4WD on the back to tow it out of trouble.

Larry and Peter arrived at their location and began a methodical grid search on the quad, working within a 5km radius and checking the lee of every dune.

"I was driving the quad bike and my brother was on the back; we had numerous false alarms," Larry recalls. "After four and a half days we had reached the limit out of our radius. Then Peter said, 'What's that over there?' So I immediately turned and went the 20 or 30m, stopped the bike and ran over. And you could immediately see it was the find. There were four water containers sticking out of the desert grass and that was it.

"They were the only items visible, but then within a 50m radius we found about 10 more surface items: a bottle, a porcelain cup, a lamp... a doo-lackey that had something to do with navigation. And the rest is bloody history!"

Larry hauled out his metal detector and quickly established there was a huge trove of gear. Nothing had been disturbed,

nothing had been taken. For more than 100 years it had sat in the desert, slowly decaying but completely undisturbed.

"When you are out looking for something of this magnitude you think 'God it would be nice to find it', but you concede you probably never will," Larry says. When he sighted it, he was overwhelmed. "I could go and win Bathurst, but anyone can do that. This was a tremendously good feeling. It was just fantastic to think we had actually found it after a multitude of searches over more than 100 years."

Larry and Peter remained onsite for three days. Then, after concealing the discovery, they left. Three weeks later they returned with two Northern Territory government-appointed archaeologists and a photographer. A third trip later completed the excavation of the site and that time Larry brought several mates along to help.

"We've found virtually everything on the list," he says. That includes more than 800 rounds of ammunition, sharpening stones and a harmonica. The discards tell the story of how desperate the expedition's plight was. Even a tiny SA Cricket Association membership medallion was left behind.

Some of the equipment also prompted Larry to surmise the expedition had another, secret, purpose.

"It's not listed, but I think the primary reason they were out there was searching for gold," Larry says, explaining the cache included weighing scales for gold and grain weights, three miners' picks and two gold-panning dishes.



**Trip three's dig team (L-R):** photographer and friend Peter Blakeman, NT archaeologist Malcolm Connolly, Peter Perkins, friend Christy Peers, Larry Perkins, friend Jim Kurtin and archaeologist Caroline Wilby.



► **A small taste of the** massive amount of gear unearthed by the Perkins brothers – carpenters' tools and a kerosene lamp among it.



▲ **Finds included a** membership of the SA Cricket Association attached to an open locket, which had no photo but was full of fine sand.

**“I have no desire to profit from it in terms of a private collection. That’s not what it’s about.”**

The entire find has now been catalogued and shipped to a Museum of Central Australia warehouse in Alice Springs. Larry’s wish is that it stays together in perpetuity. He regards himself as the owner of the trove – which was still being sorted out legally at the time of going to press – and doesn’t want it sold off or split up.

He wants it clear who owns it, not because he wants to gain from it. “I want it on public display forever and no-one able to profiteer from it,” he explains.

“I have no desire to store it in my back garage and I have no desire to profit from it in terms of a private collection. That’s not what it’s about.”

For Larry, it’s about helping modern-day Australians understand their brave and self-reliant forebears. He says the find is significant for both its size and quality, and that makes its preservation vital.

“In many cases explorers vanished and we really didn’t know much about what they carried,” he says.

“So it was significant to find everything and for it to be totally untouched from the day they put it there. According to the archaeologists, the quality of the items uncovered is superb, just superb.”

The story attracted international attention. Michael Wells, director of the heritage branch at the NT’s Department of Lands, Planning and the Environment, explained to the ABC the significance of what Larry had tracked down, describing it as

“a unique insight into early European exploration of Australia in the late 19th and early 20th centuries.”

**T**HE STORY DOESN’T end here. Larry has since been inundated with requests to help solve other outback mysteries. “I’ve had many more emails than I ever got for winning Bathurst,” he says, laughing.

The one he has become most fascinated with keeps him linked to Barclay. Larry wants to find out what happened to Ludwig Leichhardt.

“There’s no bigger mystery,” he says, explaining that he is now working with colleagues in Brisbane who have searched the outback numerous times looking for an answer.

“We are working on old documents [and] with metal detectors. I am very hopeful we can put proper facts on the table. We think we know where Leichhardt ended up, but we want to find evidence. We have found some items that have started stacking up, but there’s more work to be done there.”

It’s work Larry is relishing in his beloved outback.

“I love being ‘out in the field’ as the archaeologists say. But I don’t want to just go out looking over endless sand hills and hoping to stumble on something. The chances of finding something are just ridiculously small,” he explains.

“So work out where to put the dot on the map and then search.”

Logical really.



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STORY BY ANDREW TINK

# Honeysuckle Creek

and the little-known heroes  
of the Moon walk broadcast





**Posing proudly in front of the communication dish at Honeysuckle Creek Tracking Station, so crucial in bringing the world the historic footage of the first human stepping onto the Moon, are Tom Reid (front row far left) and the team he led during the Apollo 11 Moon mission.**







**A**S POLITICIAN-turned-writer Andrew Tink viewed the opening scenes of the 2000 film *The Dish*, he thought “wrong person, wrong place” as he watched actor Sam Neill playing fictional character Cliff Buxton walk towards the Parkes radio telescope. The film portrays Australia’s role in relaying live television footage of the first man on the Moon during the 1969 Apollo 11 mission. But it omits the pivotal role of NASA’s Honeysuckle Creek Tracking Station, about 300km south of the Parkes Observatory, near Canberra.

Honeysuckle provided the historic live footage of Neil Armstrong stepping onto the Moon that was seen by more than 600 million people worldwide at 12.56pm (AEST) on Monday 21 July 1969.

Andrew has made it his mission to right the record and recognise the crucial role of the Honeysuckle team, particularly station director at the time Tom Reid, in bringing those images – some of the most watched footage in human history – to the world.

**A**FTER 19 YEARS as a member of the NSW Legislative Assembly, I stepped down in 2007 and took up writing, mostly biographies. I knew Tom Reid, who’d been the station director of NASA’s Honeysuckle Creek Tracking Station during the Apollo 11 mission, through his daughter Marg – we’d dated during the early 1970s.

Although I didn’t understand exactly what role Tom and his team at Honeysuckle had played in televising the live broadcast of Armstrong’s first steps on the Moon, I knew it had been important and I wanted to tell Tom’s story. I knew him well enough to understand that he would never have agreed to me writing about his NASA career. Not one to blow his own trumpet, Tom would have done his best to dissuade me. ▶



## Andrew Tink

left politics after two decades in the NSW parliament to focus on writing. His first book, *William Charles Wentworth: Australia’s Greatest Native Son*, won ‘The Nib’ CAL Waverley Library Award for Literature 2010. His other books are: *Lord Sydney*; *Air Disaster Canberra*; *Australia 1901–2001*; and *Honeysuckle Creek: The story of Tom Reid, a Little Dish and Neil Armstrong’s First Step*. Andrew is a past president of the Library Council of NSW and currently an Adjunct Professor at Macquarie University.





◀ On 16 July 1969 the huge 111m-tall Saturn V rocket launched on the Apollo 11 mission from Pad A, Launch Complex 39, Kennedy Space Center, at 9.32am EDT.

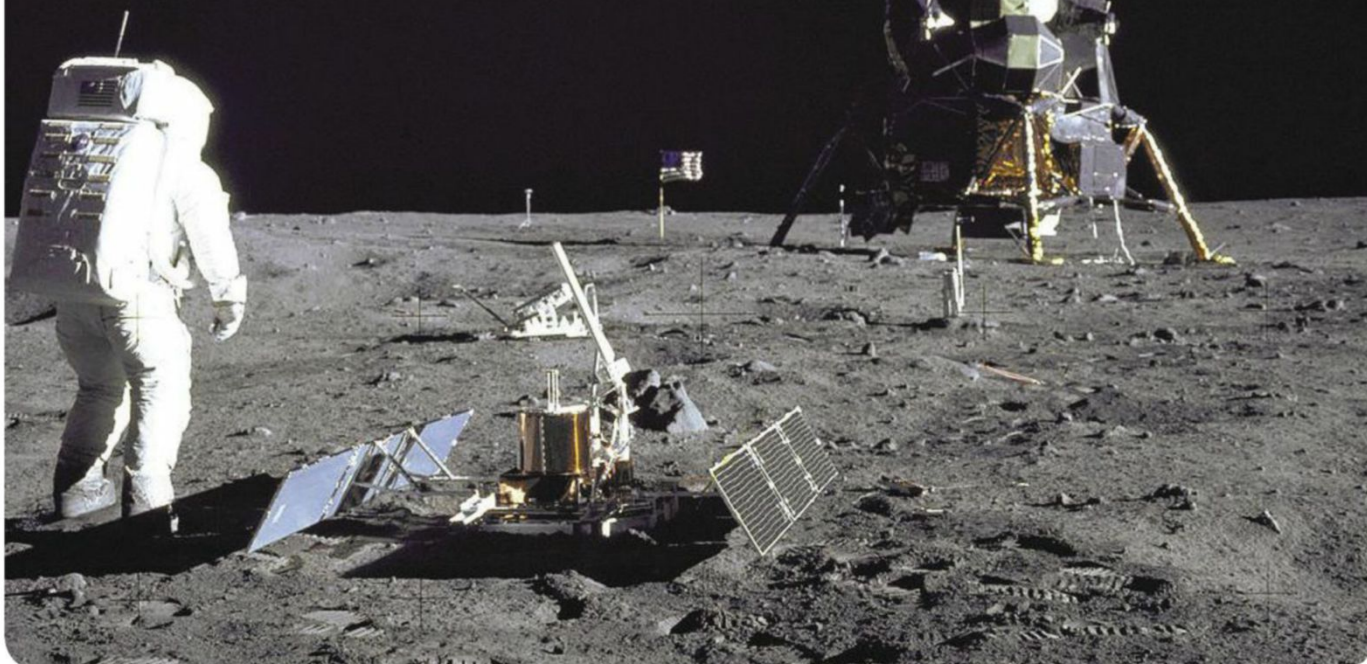
▼ Tom Reid (seated centre) talks to his deputy, Mike Dinn, in Honeysuckle Creek's Operations Control Room. To Tom's right are Ken Lee and John Saxon (standing) and to his left, Ian Grant.



▶ **Spacecraft communicators in Mission Control at Houston, Texas, kept in contact with the Apollo 11 astronauts during their lunar landing mission on 20 July 1969 EDT\*.** From left to right are astronauts Charles M. Duke Jr, James A. Lovell Jr, and Fred W. Halse Jr.  
\*EDT: Eastern Daylight Time USA



**Astronaut Buzz Aldrin** at Tranquility Base, the Apollo 11 team's Moon landing site, with equipment for on-site experiments and sampling.



**Buzz Aldrin (left, at left)** and Neil Armstrong, at Manned Spaceflight Center, Houston, take a break from training for the Apollo 11 lunar landing mission. Buzz holds a tool designed for picking up rocks from the Moon's surface. The two men later spent just 21.5 hours on the Moon's surface, guided under the distant eye of Mission Control (below).



PHOTO CREDITS, CLOCKWISE FROM TOP: NASA; NASA / AIG-IMAGES; BETTMANN / CONTRIBUTOR



► Just a second or two before Neil Armstrong stepped onto the Moon, Hamish Lindsay snapped this iconic shot of the Honeysuckle dish, which was already transmitting the live TV images it was receiving from the Lunar Module, *Eagle*.

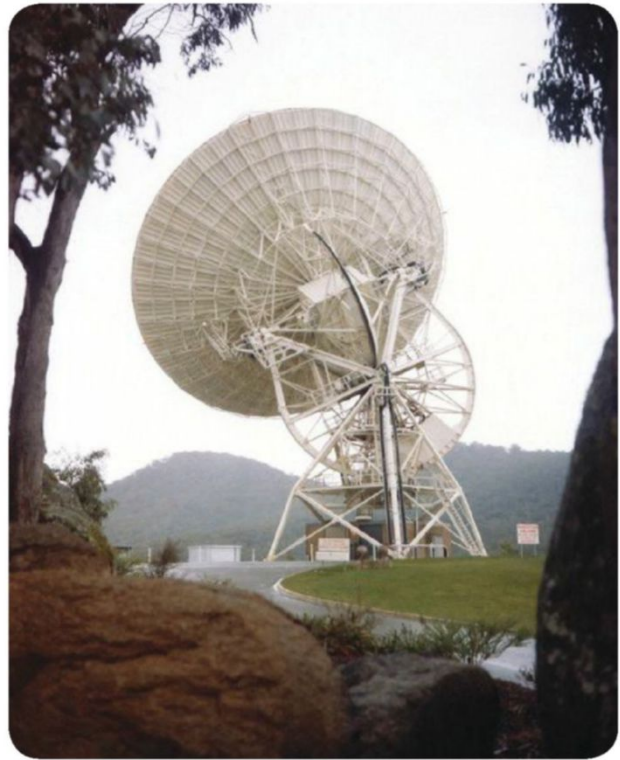
It wasn't until after Tom Reid's death in 2010 that I began to scope out the possibility of a book about Honeysuckle Creek. A number of Tom's former colleagues, among them his deputy at the time, Mike Dinn, were still in a position to talk to me. And Dinn got straight to the point: "*The Dish* implies that Parkes was the communication facility in Australia for Apollo 11. The truth is that Honeysuckle Creek was. Parkes was and is a radio telescope – not a tracking station. Parkes had no transmitter and so could not send commands or voice to the spacecraft. So 'Parkes go for command' as used in the movie is completely wrong and misleading. And the movie studiously avoids stating that the first TV transmission to Australia and the world came from Honeysuckle Creek."

Hooked by the realisation that it was a little dish outside Canberra that had brought the live television of Neil Armstrong's first step on the Moon to a then-record worldwide audience of 600 million viewers, I decided to write *Honeysuckle Creek: The Story of Tom Reid, a Little Dish and Neil Armstrong's First Step*, a book about Honeysuckle intertwined with the story of Tom Reid.

TOM, A GLASGOW-BORN ELECTRICAL engineer with a naval background, began his career with NASA in the late 1950s in the remote outback town of Woomera, in South Australia. His first job at Woomera was to track British medium-range ballistic missiles for the Weapons Research Establishment. But following the orbital flight of Sputnik I – the world's first artificial satellite – in 1957, NASA came calling and Tom began tracking satellites for the Americans. An orbiting satellite could only be tracked from any single point on Earth for about seven minutes and so NASA built some 18 tracking stations around the globe, including one at Woomera.

For voyages to and from the Moon, however, a network of more sophisticated tracking stations was required. Three were built: one at Goldstone in California; one near Madrid, in Spain; and one at Honeysuckle Creek, outside Canberra. Placed roughly equidistantly around the globe, each had a view period of about eight hours. So, as the Earth spun on its axis once every 24 hours, these stations were collectively able to continuously communicate with astronauts on or near the Moon. Without these three stations, Mission Control in Houston, in the USA, would have been deaf, dumb and blind to Apollo astronauts.

The Apollo tracking stations had transmitters powerful enough to send ultra-high-frequency radio signals at a speed of about 299,338km/s. These signals carried a voice link and remote commands to the spacecraft, as well as a ranging code to determine exactly where the astronauts were. The stations also had sensitive receivers to pick up the astronauts' voices, the returning ranging codes and, most importantly, telemetry (or data) relating to such things as the astronauts' heartbeats and their spacecraft's fuel levels.



## Honeysuckle tracked successive Apollo missions 7, 8, 9 and 10, each with great success.

Travelling at the speed of light, these radio signals took just a second or so to cover the 804,672km round trip, from Mission Control in Texas to the astronauts on the Moon and back, so they could converse in almost real time.

Opened in early 1967, Honeysuckle at first had no Apollo spacecraft to track. Instead, NASA conducted gruelling simulations. These soon revealed Honeysuckle's woeful performance compared with the other stations.

Although Honeysuckle's first director, Bryan Lowe, was highly intelligent and personable, he struggled with detail and was unable to meld his tracking team into a smoothly functioning unit.

Unlike Goldstone and Madrid that had Americans in all key positions, there was not an American accent to be heard at Honeysuckle. It was government policy that the director had to be a citizen or permanent resident of Australia.

As the government searched for a new director, Tom's name stood out. With almost a decade of space tracking experience, his hard-driving, no-nonsense style and ability to lead a diverse team of engineers and technicians made him the natural choice.

Within months of his appointment, Honeysuckle had been transformed from the worst performing Apollo tracking station into the best. Under Tom's leadership from August 1967, Honeysuckle tracked successive Apollo missions 7, 8, 9 and 10, each with great success.



Photographed in 2016, backdropped by Tidbinbilla's big dish, are (L–R) Hamish Lindsay, John Saxon, Gene Cernan (the last man on the Moon), Mike Dinn and Ed Kruzins (Tidbinbilla's director).



BY MID-1969, NASA WAS ready to launch Apollo 11, the mission earmarked to fulfil President Kennedy's promise, made in 1961, of landing a man on the Moon and returning him safely to Earth before 1970. Just a few weeks before the launch, NASA resolved an internal debate that had been raging since 1961: was it necessary or desirable to attempt live TV coverage of the moment the first person stepped onto the Moon?

Those against broadcasting the event were concerned about the heaviness of a camera. Weight on the Apollo Lunar Module was so critical that the astronauts' seating had to be discarded, requiring them to stand while flying. Those in favour of the broadcast argued that American taxpayers, who had stumped up billions of dollars for the Apollo program, had a right to see live in their lounge rooms the moment an astronaut first stepped onto the Moon.

Following the development of a super lightweight camera, advocates for televising the event won the day. But with space aboard the Lunar Module at a premium, this equipment was mounted in a way that it began filming from an upside-down position. Because of this, a special reversing switch was fitted on each of the Apollo tracking stations' TV scan converters, to allow a technician to flip the upside-down TV image the right way up.

In the weeks leading up to the launch of Apollo 11, the radio telescope at Parkes, located in central NSW about 300km north

He heard Armstrong say:  
“Houston, Tranquility Base  
here. The *Eagle* has landed.”

of Honeysuckle, was added to NASA's array of Australian dishes for extra backup. Although it couldn't transmit anything, Parkes's 64m-diameter dish made it an excellent receiver compared with Honeysuckle and its 26m-diameter dish. At that size, however, the Parkes dish could only be angled down to 30 degrees above the horizon. But the Honeysuckle equipment, being a special Apollo dish, could be angled down to zero degrees to the horizon.

Although Canberra and Parkes were on roughly the same longitude and the Moon rose over them at about the same time, this difference in the minimum angulation of the dishes meant the Moon rose over the Honeysuckle dish two hours before it rose over the Parkes dish.

On 16 July 1969, the day Apollo 11 blasted off from Cape Canaveral in Florida, USA, NASA's Australian dishes included: Carnarvon, in Western Australia, which was used to track the first and last hours of the mission; Honeysuckle Creek, which tracked the Command Module when it was in separate flight;



Three hours before Armstrong's first step, prime minister Gorton held a press conference in front of the Honeysuckle Creek dish, which had been moved out of its tracking alignment to facilitate this photo opportunity.



▼ **Honeysuckle Creek** was closed as a space-tracking station in 1981 and later levelled, although the facility's concrete foundations remain. This outdoor display was added in 2001.



a deep space tracking station at Tidbinbilla, just north of Honeysuckle, which was used to track the Lunar Module; and Parkes, which provided a downlink backup. All but Carnarvon were rigged up to receive the Lunar Module's downlink TV signal.

Two days after the Apollo 11 launch, however, a fire at Tidbinbilla resulted in a switch of duty. Honeysuckle would track the Lunar Module and, when the two vehicles were operating separately, Tidbinbilla would be responsible for the Command Module.

THE HONEYSUCKLE CREEK Tracking Station complex was located in the ACT's geographic centre, on and immediately below a ridge that sat saddle-like between two granite peaks. It had been built on a series of terraces bulldozed out of the mountainside to create a 5.7ha clearing among the eucalypts. Secured to the top of the ridge was the station's most prominent feature – its 26m dish – the apex of which was almost 1200m above sea level. The station's operations building and power generators were on the terraces below. Snow often fell at the site during the winter months, especially in July.

With the Moon landing scheduled for just after 6am on Monday 21 July (AEST), Tom Reid had stayed over at the tracking station the previous night and was up early to listen in to Neil Armstrong and Buzz Aldrin as they flew their Lunar Module towards the Moon's surface. Although the Moon would not rise over Honeysuckle until just after 11am, Reid could hear the astronauts talking to Mission Control through NASA's communication net. And just after 6.15am, he heard Armstrong say: "Houston, Tranquility Base here. The *Eagle* has landed."

According to the Apollo 11 flight plan, Armstrong and Aldrin were not due to take their Moon walk until about 4pm. At that time their connection to Mission Control would be via the dishes at Honeysuckle and Parkes, with the much bigger Parkes dish earmarked as the prime receiver of lunar TV footage.

Armstrong and Aldrin, however, didn't want to wait that long. Just after 8am, they convinced Mission Control to let them conduct an early Moon walk, to commence as soon as they had completed their post-landing checks, eaten something, and suited up. NASA's new best estimate was that Armstrong would take his first step at about 11am.

At that time Goldstone would still be receiving a good signal, while the Lunar Module would just be coming into view of Honeysuckle. The moonrise over the Parkes dish, however, would still be more than two hours away.

Just before 9am, as the Honeysuckle team scrambled to adjust to this demanding new timetable, prime minister John Gorton turned up for a station tour. Believing he had little choice in the matter, Tom had reluctantly agreed to this VIP visit the previous evening. But knowing that his team would be less than impressed by the prospect of such an interruption, he hadn't forewarned them.

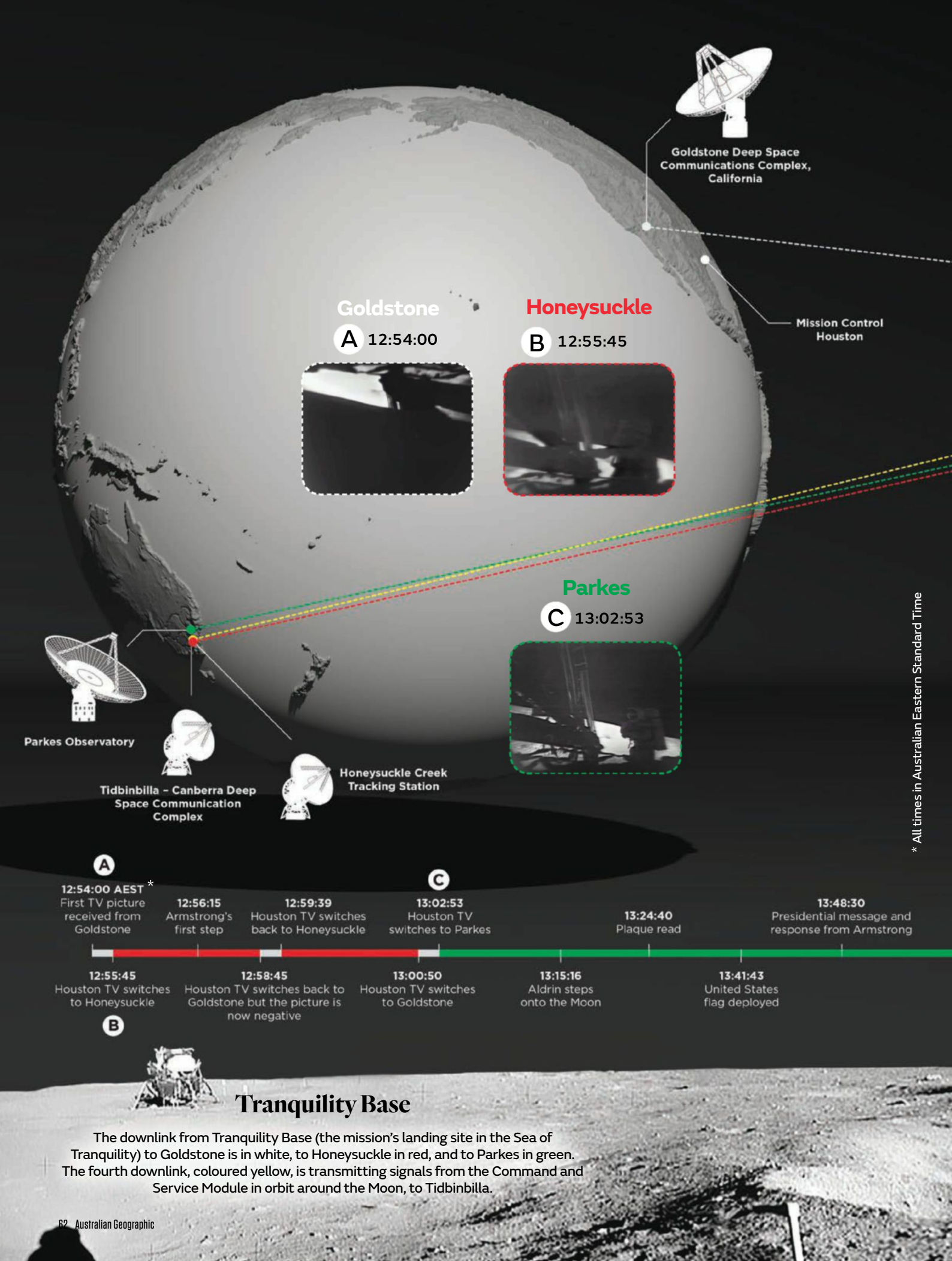
As the prime minister toured the operations building for almost an hour, some of the trackers cursed under their breath as they suddenly became aware of Gorton and his entourage hovering behind them. After Honeysuckle's dish had been moved out of its tracking alignment for a prime ministerial photo opportunity, Gorton departed at about 10am and Tom and his team were able to refocus on final checks with Mission Control.

At 11.15am the Moon rose over the gum-tree covered horizon beside Dead Mans Hill, upon which the receivers on Honeysuckle's dish locked on to the Lunar Module's signals, which were being generated by its tiny 66cm antenna. The astronauts' voices and telemetry now streamed into Honeysuckle's operations control room.

After being processed by the station's computers, these signals were forwarded to Houston, all at a speed that made it possible for Mission Control to have a conversation, in almost real time, with Armstrong and Aldrin.

Continued page 64 ►





The downlink from Tranquility Base (the mission's landing site in the Sea of Tranquility) to Goldstone is in white, to Honeysuckle in red, and to Parkes in green. The fourth downlink, coloured yellow, is transmitting signals from the Command and Service Module in orbit around the Moon, to Tidbinbilla.

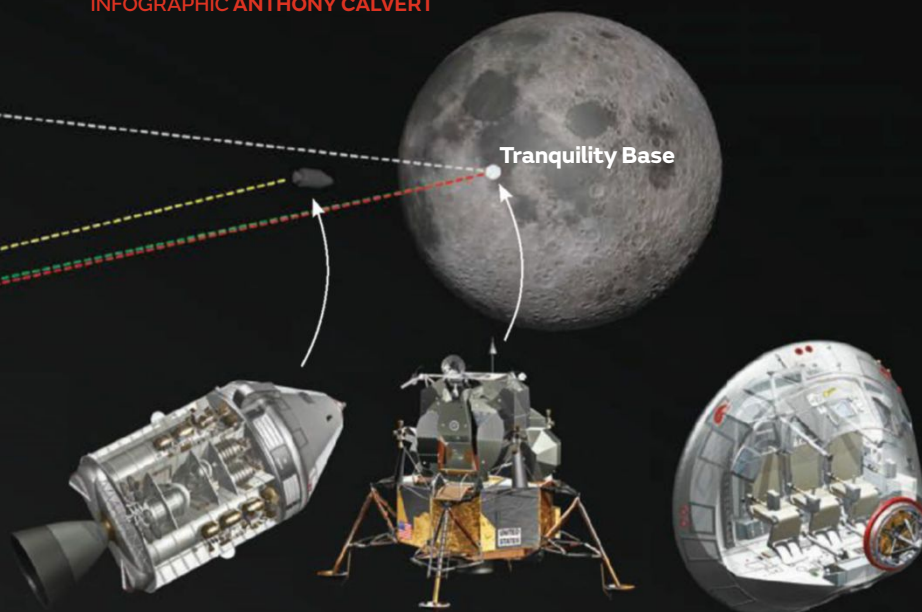


# Taking the Eagle's view

Images of humankind's first step on the Moon travelled more than 384,000km almost instantly to be seen live across the Earth.

INFOGRAPHIC ANTHONY CALVERT

AS NEIL ARMSTRONG climbed down the Lunar Module's ladder, he activated a remote TV camera that transmitted live pictures of the scene to the Apollo tracking stations at Goldstone in California and Honeysuckle Creek outside Canberra. At that time, both stations had the Lunar Module in view and both sent their TV signals on to Mission Control in Houston, Texas. The first TV images seen by the record worldwide audience came from Goldstone. But due to technical difficulties, Houston switched to Honeysuckle about 30 seconds before Armstrong took his first step. Then about six minutes after this, Houston switched to the signal from Parkes for the remainder of the Moon walk. This diagram illustrates these three TV downlinks, while the timeline shows precisely when each of the TV signals was seen by the world. In total, Neil Armstrong and Buzz Aldrin spent 21 hours and 36 minutes on the surface of the Moon.



## Command Module and Service Module (CSM)

■ The Command Module *Columbia* is the conical section on the nose of the cylindrical Service Module and it carried the three astronauts. The Service Module contained scientific instruments, fuel cells and propulsion systems. Armstrong and Aldrin flew to the Moon's surface and back in the Lunar Module while Michael Collins remained in lunar orbit aboard the Command Module.

## Lunar Module (LM)

■ Called the *Eagle*, this had two stages. With four folding legs, a descent stage allowed powered landing on the Moon, and was also the launch pad for the ascent. The upper stage housed the flight controls and propulsion systems for returning the two astronauts to lunar orbit and the docking manoeuvre with the CSM. The descent stage was left on the lunar surface.

## Command Module

■ This conical craft had a base diameter of 3.91m and contained the main control panels, navigation systems, equipment lockers, food, and the docking tunnel for the LM. The Service Module stage was jettisoned on re-entry to Earth's atmosphere after which the Command Module successfully splashed down in the Pacific Ocean.

15:11:07  
EVA ended  
(hatch closed)

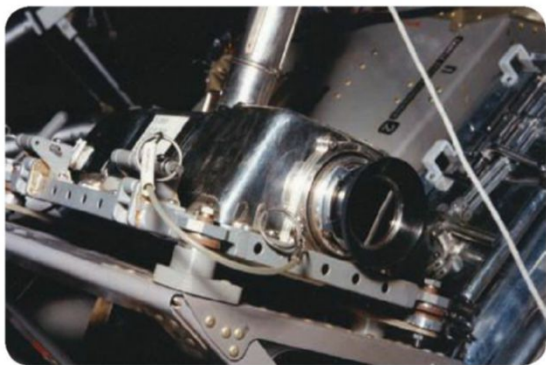
**Apollo Glossary:**  
LM - Lunar Module, EVA - Extravehicular Activity

15:09:32  
Armstrong inside LM,  
assisted and monitored  
by Aldrin

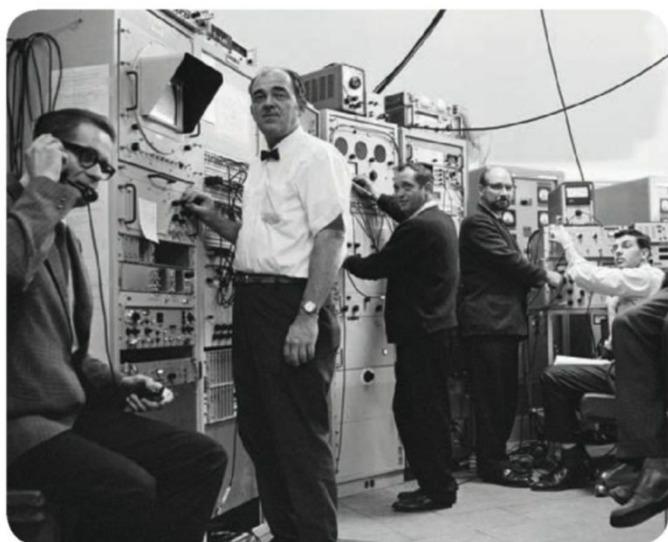
17:57:37  
TV off







**A lack of space** meant Apollo 11's TV camera had to be mounted upside down in the Lunar Module's stowage bay (above left). At Australia's National Radio Astronomy Observatory at Parkes (above) during the 1969 Apollo 11 moon walk, American scientists (left) collected the astronauts' television images and sent them around the world by satellite.



**A**LL THE WHILE, THE astronauts were suiting up in the Lunar Module. To survive during their Moon walk, they had to turn themselves into what amounted to small self-contained spacecraft, capable of maintaining Earth-like conditions around their bodies and ongoing communications with Mission Control.

Specially cooled and ventilated, their space suits were bulky and cumbersome to put on, and this took much more time than expected. But the astronauts were in no hurry. To make a mistake was to chance a horrible death by asphyxiation: their lungs would collapse as the air in their hearts bubbled and their blood vessels ruptured, all within a minute or so. It wasn't until sometime after 12.30pm that Neil Armstrong sounded like he was ready to emerge from the Lunar Module. Back on Earth, a record live-television audience of 600 million people – then, almost a fifth of the world's population – listened to various commentators doing their best to fill in time as they waited for Mission Control to begin its promised live TV feed of Armstrong starting his climb down the Lunar Module's ladder.

It was now clear to Tom that Armstrong would take his first step onto the lunar surface minutes before the Moon rose over Parkes. Although Parkes's off-axis receiver might be able to pick up a TV signal a little earlier, Tom knew it would be unstable, possibly jerky, prone to drop in and out, and wouldn't be of broadcast quality. This meant that for Armstrong's first step, Honeysuckle's dish would be Goldstone's only backup. With mounting excitement, Tom pressed his intercom button and barked "Battle short!", a direction to his team to let their equipment bypass safety circuit-breakers for the next crucial minutes.

After emerging from the Lunar Module, Neil Armstrong crawled backwards across a small platform he'd nicknamed 'the porch', towards a 2.4m ladder attached to one of the module's landing struts. Before taking his first step down the ladder, he pulled on a D-ring attached to a lanyard. This activated the Lunar Module's external stowage bay, which swung out and down to reveal a small TV camera trained on the ladder. After some adjustments to a circuit-breaker, it began filming from its upside-down position. For a split second, what Honeysuckle's TV technician Ed von Renouard saw confused him: "It was an indecipherable puzzle of stark blocks of black at the bottom and grey at the top, bisected by a bright diagonal streak. I realised that the sky should be at the top, and on the Moon the sky is black, so I reached out and flicked the switch and all of a sudden it all made sense, and presently Armstrong's leg came down."

However, at Goldstone, the TV technician mucked up his reversing switch. After attempting to correct his error, he increased the contrast on his TV scan converter's output, dragging most of the picture into the black, and making it very high contrast. Still struggling, his next mistake was to adjust the focus, the result being that the photo was not as sharp. A little while after that, he tried another setting, turning the picture to negative. This had the effect of compressing the shadow areas into white. With each mistake, Goldstone's TV technician compounded his problems. In a room behind Houston's main Mission Control room, Ed Tarkington, who was responsible for deciding which lunar TV feed to put live to air, could not understand why the pictures he was seeing coming in from Honeysuckle were so much better than those from Goldstone. How was it that Tom's team with





In a scene repeated thousands of times around the world on 21 July 1969 (AEST), a crowd gathers around a publicly accessible television screen at Sydney Airport to watch Neil Armstrong become the first person to step onto the Moon.

## “All stations, we have just switched video to Honeysuckle.”

their 26m dish was doing so much better than the American team with its 64m dish? Known throughout the NASA network by his call sign ‘Houston TV’, Tarkington initially put his faith in the bigger dish and Goldstone’s pictures went live to air around the world. But it was impossible to make out what Armstrong was up to.

For almost two minutes after filming began, Tarkington persevered with Goldstone, hoping its pictures would improve. But they got worse. By now Armstrong had reached the bottom of the ladder and was standing on one of the Lunar Module’s foot pads. Knowing that Armstrong’s first step was imminent and that the TV feed going to air was still a mess, Tarkington made an announcement over NASA’s worldwide communication net: “All stations, we have just switched video to Honeysuckle.”

IT WAS THANKS TO Honeysuckle that 600 million people were able to clearly see Neil Armstrong for the first time since the live feed commenced. He held on to the Lunar Module’s strut for the next 25 seconds then, with one boot still firmly planted

on the foot pad, tested the lunar dust with the tip of his other boot. “As you get close to it,” he said, “it’s almost like a powder. The ground mass is very fine...I’m going to step off the LM now...”

A short pause in Armstrong’s voice transmission followed, during which Honeysuckle’s TV signal showed him letting go of the strut and stepping backwards to plant his left foot in the lunar dust. It was 12.56pm at Honeysuckle when Armstrong said: “That’s one small step for [a] man, one giant leap for mankind.”

Tom and his team had absolutely nailed live television of this unprecedented moment when a human being first stepped onto a celestial body. For those who were privy to the telemetry streaming into Honeysuckle from Armstrong’s space suit, his heart was beating 112 times per minute, compared with Aldrin’s 81.

Honeysuckle’s live TV feed continued to air worldwide until the main signal from Parkes finally came online, more than six minutes after Armstrong had taken his first step. From then until the end of the two-and-a-half-hour broadcast, Tarkington elected to use Parkes’s stronger signal generated by its larger dish, for the worldwide TV broadcast.

Despite the Honeysuckle team’s pivotal role in enabling the live broadcast, it wasn’t until a 20th-anniversary dinner in 1989 that Tom publicly acknowledged what he and his team had accomplished: “It hadn’t been planned that way,” he said. “But that’s the way it was. And goddamn it, we were ready!”

AG

**AUSTRALIAN GEOGRAPHIC** thanks John Sarkissian and Hamish Lindsay for their assistance with this article.





STORY BY TIM LOW

# AUSTRALIA'S ARKS

Fenced reserves and captive breeding programs  
can bring treasured species back from the brink,  
but there are limitations.





▲ **Western quolls** are adapting to the desert climate in SA, even though they have descended from quolls caught in forests near Perth. The species once thrived in the outback, but no original outback populations have survived.







**I** WATCH AS THE rusty strands break apart in my fingers, knowing full well that this fence in the South Australian desert means life or death for the bilbies, bettongs and other rare animals inside it. My companion, biologist Dr Kath Tuft, is frowning at other decaying strands.


We have paused on the boundary of Arid Recovery, the 12,300ha wildlife reserve Kath manages, to inspect its predator-proof fence. The rust we find is confined to some strands buried in shallow sand, which means that no fox or cat can get through, but this section will need replacing sooner rather than later. Should the corrosion worsen, rabbits will claw their way through, foxes and cats will follow and...you can guess the rest.

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◀ **Kath Tuft carries** out essential maintenance on Arid Recovery's floppy top fences. The fence design, pioneered here, prevents foxes from digging under and cats from climbing over into the 'exclosures' where reintroduced native species live.

The alkaline soil out here wreaks havoc with buried fencing, and it plays with my imagination as well. That imposing fence we had been driving beside now seems flimsy, as if spun of cotton. The stories Kath tells don't help. Holes have been made by buck kangaroos, one on each side, kicking each other in tiffs over females. Those holes aren't the worst kind, she says, because they appear some way above the ground, so predators are slow to find them.

In western Queensland, Currawinya National Park had a fence that failed in a spectacular way. Corrosion following sustained floods in 2011–12 allowed cats to enter a 2500ha enclosure and few, if any, of the bilbies inside survived. Fenced peninsulas in Shark Bay, Western Australia, have foxes creeping around the ►



## exclosure

(say eks'klohzhuh)

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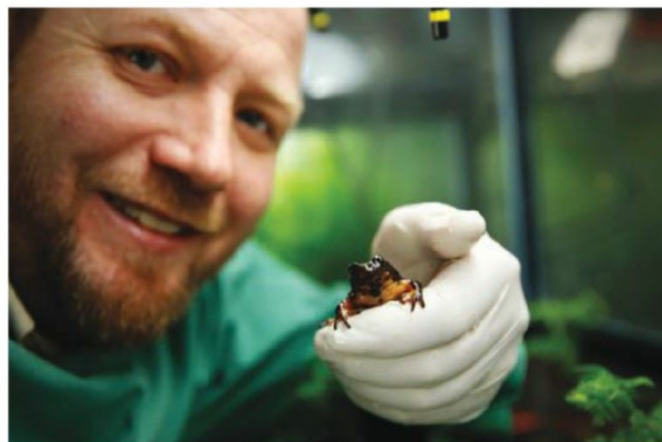
**noun** an area fenced to prevent animals getting into it, as to prevent feral animals from attacking farm animals, or domestic animals from stripping vegetation.



▼ **Burrowing bettongs** might look small and innocuous, but they aren't the best of tenants. In fenced reserves they can rapidly denude large areas of vegetation.



▼ **Melbourne Zoo amphibian specialist** Damian Goodall, team leader for operations of the reptile and amphibian department, holds a female Baw Baw frog.



## But no system of protection is guaranteed; this work is complex, demanding and sometimes fails.

edges at very low tides and entering through holes caused by corrosion or storms. One fox in the reserve Heirisson Prong killed 33 bettongs before it ate a poison bait.

Conservation today is often about barriers of some kind, helping species breed inside aviaries, pens, cages, terraria, aquaria or large enclosed reserves. Australians are world leaders in fenced conservation, and captive breeding has saved some of our treasured wildlife from certain extinction. Dwell on the successes and a heart-warming story can be told.

But no system of protection is guaranteed; this work is complex, demanding and sometimes fails. Fences don't look after themselves, and animals can be difficult to breed and impossible to return safely to the wild. At Arid Recovery, success itself has become a problem. Burrowing bettongs, breeding like rabbits to 10 times natural densities, are trashing the vegetation inside, ruining habitat for other rare tenants. They worry Kath more than rust patches on fences.

**A**T MELBOURNE ZOO I'm led behind the public area to a humble shipping container to hear a different catalogue of problems. Before he goes inside, Deon Gilbert, threatened species officer for Zoos Victoria, dons an apron, plastic gloves and gumboots. While I stay at the doorway, he holds up little tadpoles wriggling in plastic cups and tiny Baw Baw frogs in moss-laden vivaria.

Being creatures partly of land and partly of water, frogs can't be bred without discovering the separate needs of eggs, tadpoles and adult frogs. That can take years, and time is not on Deon's side. Naturally confined to only one mountain in Victoria, the Baw Baw frog is down to one wild colony on one stretch of one stream deep inside a towering mountain ash forest. It has been eliminated from other streams by logging and chytrid,

a deadly fungus that has been decimating frog populations worldwide. The gear Deon wears is for disease hygiene.

"Just because you can rear something doesn't mean you can get good adults," he says. Deon was able to raise young frogs from wild eggs back in 2013, but some died and the rest were unhealthy. The problem, calcium deficiency, was resolved by switching the frogs from meals of crickets to a diet of woodlice, pill bugs and springtails.

Deon then found that adult Baw Baw frogs won't breed unless kept below 5°C for some weeks. But when their shipping container home is cooled, the prey they've been provided with stop moving and the frogs can't locate them. The food species are sourced from Melbourne and will have to be replaced with high-calcium versions from Mt Baw Baw that like the cold. The learning curve is slow because this frog's annual breeding season only lasts five or six weeks – one wrong detail costs a year's work for the species while Deon strives to get it right.

Taronga Zoo has no trouble feeding its endangered frogs. I follow keeper and herpetologist Dean Purcell into a drab office to a door labelled "Grasshopper Room". Inside, courting crickets chorus from large plastic boxes, transporting me, if I close my eyes, to a grassy field on a hot summer evening. Other boxes contain thousands of moving dots – baby crickets, ideal tucker for baby frogs. The corroboree and yellow-spotted bell frogs bred at Taronga thrive on them once they are dusted with vitamin and calcium supplements. Following Deon's lead, Dean now has a woodlice room as well.

Taronga learnt in five years how to breed corroboree frogs, and Deon is close to breeding Baw Baw frogs, but is not there yet. An earlier effort by both zoos to breed sharp-snouted day frogs failed; the species is now regrettably extinct, its fate a stark reminder of what's at stake.



The western quolls recently released at Arid Recovery are carefully monitored to ensure they are faring well. Here Milly Breward records measurements taken by Melissa Jensen.



**A**MONG THE ENDANGERED Australian animals that can't yet be reliably bred are Leadbeater's possum, the central rock rat and western ground parrot. Perth Zoo was condemned in a 2018 newspaper article for taking 12 ground parrots into captivity, eight of which died, six from disease, without any breeding success. Peter Mawson, head of the breeding work at Perth Zoo, seems relaxed when I mention this. "Nothing was previously known about the breeding needs of this bird," he says. The best information they had was from a 1947 failed attempt to breed eastern ground parrots.

"We've got them to lay fertile eggs and incubate them," he says, "but not to produce hatchlings." They are close, he hopes, but ground parrots are difficult to study because they spend so much time hiding behind vegetation. The zoo allows me to see them, but only on the grey screen of a closed-circuit TV.

Peter sees no future for these parrots without intervention. "We're down to maybe a hundred parrots in the wild, maybe 120," he says. A bushfire burnt through 85 per cent of their natural habitat in 2015, and another fire hit after that. Cats and foxes are other dangers. Taking parrots into captivity has depleted the alarmingly small wild population, but may save it in the long-term, if the breeding program works.

**L**IFE BEHIND GLASS OR wire is certainly not the end point anyone intends for most of these animals bred in captivity. Enabling species to prosper again in the wild is the aim. This means that for the western ground parrot, successfully breeding the birds will be one step towards success rather than success itself. The problem in Australia today is that the main perils – foxes, cats, diseases such as chytrid fungus, fire – are still out there, so releases into the wild often fail.

Some years ago more than 1400 bettongs from Arid Recovery were freed in nearby desert habitat, on land from which most of the cats and foxes had been removed. No bettong lasted more than three months, a tragedy blamed on the few predators left behind, which included dingoes. The hope had been that dingoes would suppress the last foxes and cats rather than eat bettongs. An earlier release of bettongs just outside the reserve fence, into country with intense fox and cat control and no dingoes, failed as well.

The bettongs killed in those trials eased crowding at Arid Recovery, so their loss didn't worsen the situation for the species, which survives on five islands and in several fenced reserves. The situation is much worse for the orange-bellied parrot, a species sliding backwards despite decades of earnest effort. ►



**Mark Holdsworth checks an orange-bellied parrot before its release at Birchs Inlet in Tasmania, in 2005. All attempts to re-establish the species at this site failed.**



Rather than seeing these little green parrots on a screen, I was taken inside an aviary near Hobart to meet them and my hair lifted when one flew just above my head. That was in 2008, and Sally Bryant, then manager of Tasmania's Threatened Species Unit, was upbeat. "In my opinion it's a very robust bird," she said then. "Easy to handle, easy to keep in captivity, easy to feed."

That may be so, but in 2008 there were about 50 at their natural breeding grounds in south-western Tasmania, and last December, despite hundreds of birds having been bred in captivity and set free, there were only 18. Over the years, more than 400 youngsters have been liberated at Birchs Inlet, a former breeding site, to no avail. At the one site where orange-bellied parrots still breed, Melaleuca (in Southwest National Park), releases have averaged 22 a year.

This natural population should have swelled, for its problem is not slaughter by predators but milder issues such as inadequate burning of its summer feeding grounds. It is, however, difficult to save because it is a migratory species that heads to the mainland for winter. Many fail to return, especially those bred in captivity.

Ornithologist Mark Holdsworth, who has been involved in the Orange-bellied Parrot National Recovery Program for more than two decades, mentions other issues as well, including the Millennium Drought, diseases and head injuries in captivity, and difficult decisions about how many to release and how many to keep to bolster the captive population.

The work has always been hampered by its budget. The aviary set-up allowed for only 80 breeding pairs, which meant that one goal they set, a captive colony of 400, was never realised. Speaking with the benefit of hindsight, Mark wishes they had done things differently. As it was, the limited space saw some birds kept in single-sex aviaries and denied any chance to breed. "We've lost genetic diversity over the years," he laments.

Mark hopes his new tactic of 'ranching' young birds, by holding them captive for their first winter rather than letting them migrate, will lift survival. But if, in spite of this, the wild population is lost, captive birds will be sold to parrot breeders and the orange-bellied parrot will live on as an aviary bird. That will be something the breeding work achieved, although it will be a sorry outcome for all those who gave their hearts to have this species flying free.



▼ **Perth Zoo's Peter Mawson** with a western swamp tortoise, a species that has benefited more than most from captive breeding.



▼ **Melissa Jensen releases** a western quoll at Arid Recovery where the species finds cool daytime protection from high temperatures and predators in bettong burrows.



## A successful release on just one island will be a turning point for the blue-tailed skink, which presently exists only in captivity.

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**F**ORTUNATELY, THERE HAVE been successes for other species. At Perth Zoo, for example, Peter Mawson is enthusiastic about the nine threatened species for which breeding programs have produced healthy numbers. This includes the western swamp tortoise, which might well be extinct today were it not for the 788 bred by the zoo since 1988.

There has also been good news for the dibbler, a small carnivorous marsupial that lingers precariously close to extinction in the wild: the zoo has so far turned out more than 900. Dibblers released on two predator-free islands have done better than those freed on the mainland.

While WA has more than a thousand other islands they could go to, hardly any tick the right boxes – either the climate is wrong, vegetation is unsuitable, the island is too small or too rocky, or pythons are present. On mainland Australia dibblers can avoid pythons but on islands they cross paths too often. Peter can identify only a couple more islands that seem promising.

A successful release on just one island will be a turning point for the blue-tailed skink, which presently exists only in captivity – on Christmas Island, off Australia's north-west coast, and at Taronga Zoo. Introduced Asian wolf snakes ate them all on their native Christmas Island, and the plan is to free some at a site in the Cocos (Keeling) Islands, almost 1000 kilometres further west. Those islands have no snakes, and no rare species that could be eaten by the frisky little lizards.

On Lord Howe Island, off the east coast, a plan to remove feral rats will allow the return of the Lord Howe Island phasid, a large stick insect presumed extinct until its rediscovery in 2001 (see AG 88). Before being taken into captive breeding at Melbourne Zoo, the species was barely surviving on Balls Pyramid, a rocky sea stack bursting from the sea near Lord Howe.

As for the Baw Baw frog, Deon knows of disease-free streams that lost them due to logging damage, in gullies that have since recovered. These could serve as release sites.

Arid Recovery has recently found that bettongs can survive among cats. The reserve is sectioned into several fenced paddocks, and one of these now has bettongs living with cats, implying that foxes are their main enemy. Because foxes are easier than cats to control, there could be further releases of bettongs with happier outcomes.

Arid Recovery also has new tenants to curb the bettong crush. I am there one morning when biologist Melissa Jensen calls on one of the 12 western quolls released in the reserve some months before. With her radio receiver Melissa has tracked it to a bettong warren, and we find it in a cage trap she put there the evening before. "It's a full house," she says about the quoll's pouch; there are six pink babies inside, signalling that western quolls – another threatened species – can prosper at Arid Recovery. By eating some bettongs they should help the flora recover, thereby improving the habitat for a wider animal community.

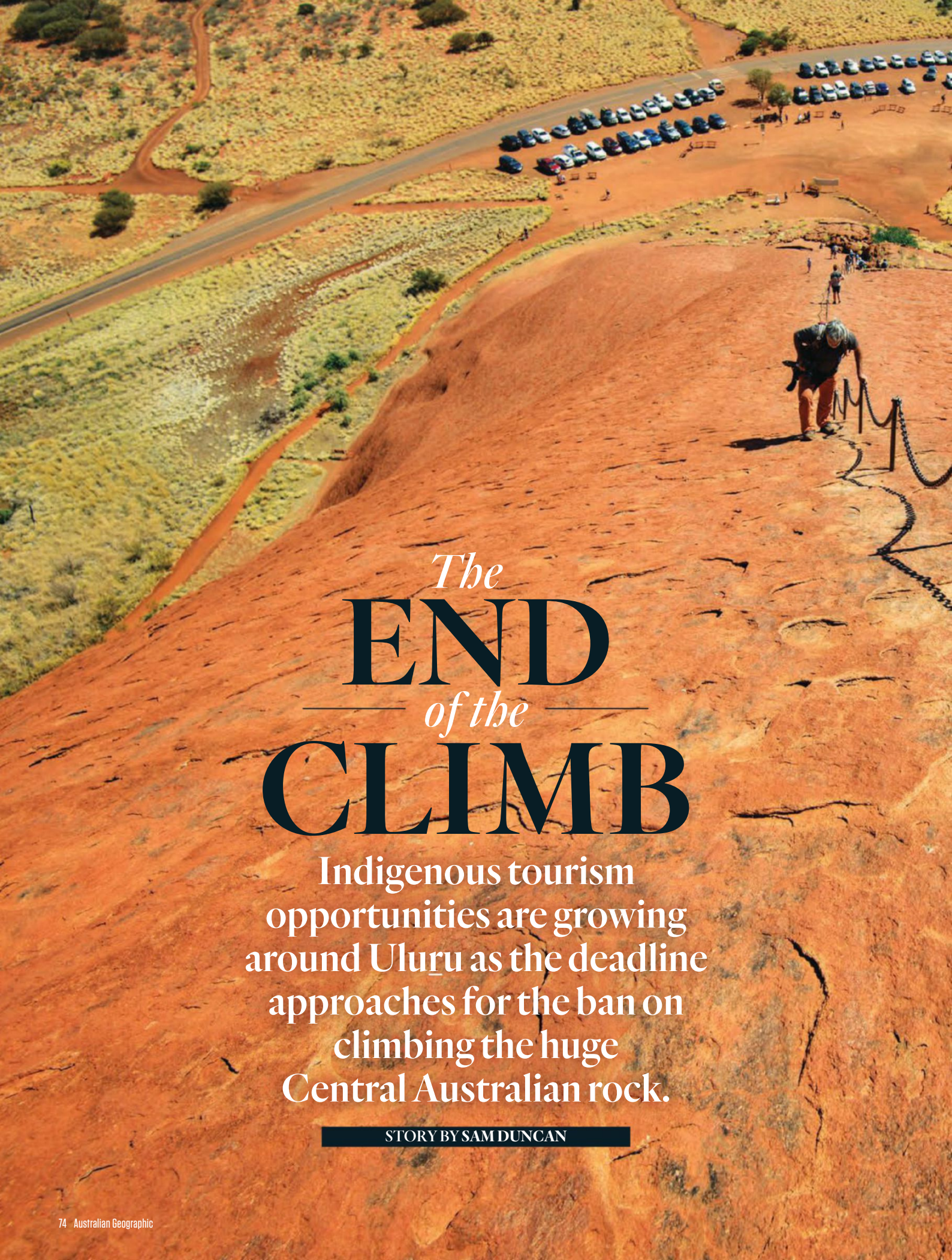
Captive breeding and fenced reserves are sometimes portrayed as panaceas, as if Australians can relax in the knowledge that committed and clever scientists are out there saving Australia's wildlife. The "committed and clever" part is true, but this work is sometimes a matter of two steps forward and one back, or one step forward and two back.

There aren't many jobs where you can save a species, or risk seeing one go extinct. The people and organisations who have taken on this work deserve our support, because Australia would be a poorer place without them.

AG

► **FOR MORE ON** captive breeding of the Baw Baw frog at Melbourne Zoo see [australiangeographic.com.au/issue151](http://australiangeographic.com.au/issue151)




An aerial photograph of Uluru, a massive red sandstone rock formation in Central Australia. A winding dirt road and a parking lot filled with cars are visible at the top of the rock. A person is seen climbing the steep, textured face of the rock, using a rope for assistance. The surrounding landscape is arid with sparse green and yellow vegetation.

# *The* **END** *of the* **CLIMB**

Indigenous tourism opportunities are growing around Uluru as the deadline approaches for the ban on climbing the huge Central Australian rock.

STORY BY SAM DUNCAN



A man in a blue t-shirt and light-colored shorts is climbing a steep, reddish-brown rock face. He is using a heavy metal chain that is anchored into the rock. The man is seen from behind, looking up towards the top of the rock. The background shows a vast, arid landscape with sparse green shrubs and a parking lot filled with many white cars in the distance. The sky is clear and blue.

The climbing chain on Uluru was installed in 1963–64 by a local cattle station owner to attract more visitors to the site and make scaling the steep rock safer.





**H**EAD OUT ON FOOT just north of Uluru-Kata Tjuta National Park's Cultural Centre, along the Liru walk, and you're soon in mulga forest – a typically stunted and harsh-looking stand of trees that, I'm told, is frequently softened by bursts of pretty wildflowers after rain. Look west and there it is: Uluru.

To some it's Ayers Rock, the name explorer William Gosse gave it in 1873. To many, it's a place of beauty and spirituality that's been the ancestral heartland of the Anangu people for more than 30,000 years. For 400,000 visitors annually from around the world, it's a bucket-list destination. This morning I can see about 80 people up on it. The large number indicates conditions are favourable but also reflects the surge in tourists visiting and scaling the site before the 26 October deadline when a legal ban on climbing Uluru will take effect. There are 138 steel posts drilled into the rock that, along with the guide chain linking them, are set for removal then.

This is the first time I've come here to see this imposing inselberg (island mountain), which is composed geologically of arkose sandstone and rises 348m above the largely flat surrounding arid landscape, and it's as remarkable as I'd always imagined. Up on the climb some people are doubled over, clutching the knee-high safety chain. One person loses their wide-brimmed hat and it comes to rest halfway down Uluru's western face.

The contours and features of this rust-hued icon are, for its traditional owners, physical evidence of Tjukurpa – the basis of Anangu knowledge, law, religion, social structure and moral values. The living landscape here is their Scripture.

▲ A tourist with the obligatory Uluru fly veil reads the Parks Australia sign at Mala car park. The "please don't climb" request from the traditional owners is unmissable.

An official sign at the base of the rock reads: "Please don't climb. We, the Anangu traditional owners, have this to say: Uluru is sacred in our culture. It is a place of great knowledge. Under our traditional law climbing is not permitted... Too many people have died or been hurt causing great sadness... We invite you to walk around the base and discover a deeper understanding of this place."

Under the intense sun, Mark and Jymie Totiel from Esperance, Western Australia, step down, back onto flat land. As Mark gently rubs her back, Jymie describes her recent health struggles. "That's from skin cancer," she says of her skin, an angry red behind a black mesh fly veil. "The climb made me feel like 'if you can do this, you can do anything.'" Mark shows me a selfie they took on the summit. "Look at that," he says. "If it's on your bucket list, you better do it. It's well worth the effort."

Charlotte Greenaway, 18, from Melbourne, tells me she won't climb because of what she and younger sister Bridget learnt at school about Aboriginal culture and sacred sites. "One [high school history] semester was all Aboriginal history, learning about giving back through native title and the Eddie Mabo case," Charlotte says. "They started teaching us about it in primary school," Bridget adds. With them is their father, Alan, who, like many people, says he was unsure how he felt about climbing the rock. He admits he thought maybe he would but his daughters told him he shouldn't, and when he laid eyes on it he decided the same.



# SURPRISING FACTS ABOUT ULURU

**Alice Springs**, the nearest town, is **468 km** away to the north-east, more than a five-hour journey by car.

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**Uluru** doesn't always look like the postcards: its appearance depends on where you're standing and the quality of the light.

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Walking around in the heat, flies and dust, it's hard to imagine it rains out here – but it does: about **300mm** a year, often in heavy downpours between November and March.

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What you see is just like the tip of an iceberg. This arkose sandstone inselberg extends several kilometres below the ground.

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**Kata-Tjuta** is only about **25km** away and you can see its stunning rock domes from almost anywhere at Uluru when you look to the west.



Uluru's colours famously shift during the day as the light changes – from golden hues to shades of orange, red, pink and purple.





**I**N 2010 the Uluru-Kata Tjuta NP board of management forecast in its 10-year management plan that it would “work towards closure of the climb”. Their prerequisite requirements included the creation of sufficient new alternative visitor experiences and that the proportion of visitors climbing had declined to below 20 per cent.

Spend time there now and you won’t run out of things to do. There are tours on segways, bicycles, dune buggies, helicopters and camels and they encompass astronomy, arts and crafts, ecology and garden walks. It’s also a foodie paradise, with traditional bush tucker the theme.

There’s coffee at the site’s Mala car park, where a joint venture between a traditional owner and two Victorian businesspeople serves a brew that would be highly rated in any Melbourne laneway cafe. Another new business is targeting the growing number of Chinese visitors, for whom the brightness of the arid night sky is a huge drawcard after the airborne pollution back home.

In a demountable at the back of the park’s administration centre, a traditional Aboriginal dot painting hangs on the wall. It features a red circle ringed by white and brown seated figures – four Anangu women, four Anangu men and four non-Anangu: the 12-person board of management surrounding the park with a yuu (traditional windbreak), representing the protection their decisions and policies provide for the culture and environment of the park and its visitors.

It was here, on 1 November 2017 that, with all preconditions met, all 12 board members voted to end the climb. The decision allowed for almost two years preparation before the closure, which was scheduled for 26 October 2019. It’s an important date for the park’s traditional owners, being the 34th anniversary of the 1985 handing back of the rock.

“People were in tears,” Steve Baldwin, the park’s operations and visitor services manager, says of the decision to end the climb. “We were crammed in to the





▲ **August 15, 1993.** With nearby Ayers Rock Resort receiving an \$8 million facelift, tourists were actively encouraged to take part in a range of activities around and on Uluru.

boardroom; the staff were all pulled in for the announcement. It was packed, and people were sitting on the floor. The buzz in the room was palpable. It was just incredible to be there.”

Steve says the response to the decision has shown the board is “not token”, and that joint management of Uluru-Kata Tjuta NP by the federal government’s Parks Australia and the traditional owners is “much more than just words”.

ON THE 30-MINUTE BUS TRIP from the resort at Yulara to Uluru, desert oaks, heath myrtles and the occasional honey grevillea give way to mulga trees and bloodwoods closer to the base of the

## Anangu have passed on knowledge through story, song and dance for thousands of years.

rock. The varying forms of the desert oaks are distinct: some are pencil thin, others bushy and mature, a transition that begins when their taproots hit water. The biggest ones have been growing slowly for more than 1000 years.

At the carpark, a group of about 30 tourists gathers for the 8am ranger-guided Mala walk. Our enthusiastic and knowledgeable Indigenous guide explains the rock art at the Kulpi Nyiinkaku (teaching cave). Generations of grandfathers painted the pictures in this cave, teaching young boys coming of age how to track and hunt kuka (food animals).

“It’s like a blackboard,” he says, then explains to the kids on our walk, “but back then there weren’t any jobs, so nobody could afford erasers. They just painted over the top.”

A young girl spots a small marsupial on the ground. “It’s a rat,” she screams.

“Maybe it’s come to learn,” the ranger responds.

Our guide continues, stopping at various sites to describe the making of seed cakes, explain how ancient tools were used, interpret rock art and provide descriptions of the desert environment and its animals. There are questions, of course. He pauses before answering, often for moments that stretch out longer than we’re used to. Yet his answers are so profound that we, too, pause at the gravity of them.

The walk culminates at Kantju Gorge, where our guide explains that the waterfall forms when heavy rain fills the rock pools at the top and then water gushes down the sheer face, filling the waterhole at the bottom where Anangu traditionally bathed and hunted. He relates the scene to sustainable hunting and water management practices, prompting us to question the habits of our modern world.

Anangu have passed on knowledge through story, song and dance for thousands of years. This time it’s coming from Leroy Lester, an Anangu area custodian. “No way you’ll be eating red kangaroo meat during a 10-year drought,” he says, as he delivers a bush tucker lesson to a crowded room at the Ayers Rock Resort. “You’ll be going from the delicatessen to the fruit and veg department. You’ll be eating a lot of underground food, a lot of roots. Our culture has lasted 60,000 years because of diet. All desert foods are superfoods. Nothing keeps out here, so you’re eating fresh superfoods every day of the year.”

Continued page 82 ►



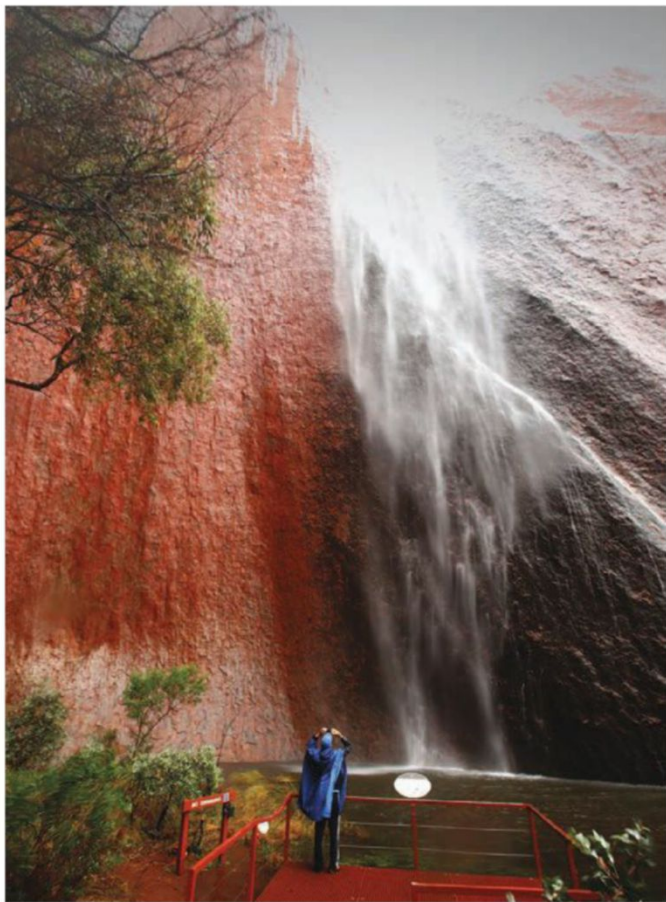


**The appearance of Uluru** from above is roughly triangular in shape. The Aboriginal community of Mutitjulu is visible in the distance.









▲ The waterfall at Kantju Gorge fills the waterhole below as it rains at Uluru. Anangu would hunt emu here, counting them in and out, only spearing the last to leave.

**T**HE DECISION TO END the climb has met with a divided response. The views of the people I meet out here are split 50:50.

Marc Hendrickx, a former NT surveyor, is the most prominent voice opposing the ban. He says evidence shows traditional owners in the past have climbed and had no issues with others climbing and that is critical information Parks Australia has misrepresented. Since the creation of Ayers Rock-Mount Olga National Park in 1958, more than 7 million visitors have “experienced the joy, wonder and exhilaration of the climb, and the remarkable views over the desert it provides”, Marc wrote in a letter to the UNESCO World Heritage Centre earlier this year.

He says the safety risks have been grossly exaggerated: “Rather than inform people about risk, Parks Australia and state authorities just shut things down to make it easier for themselves.” An outdoor enthusiast, Marc fears the closure of the climb represents a broader threat for people wanting to “get out of our mundane cities to seek awe, wonder and inspiration”.

The Uluru climbing ban is, however, in keeping with a trend occurring across many of Australia’s Aboriginal sites popular with tourists. For example, at St Mary Peak in the Flinders Ranges, National Parks South Australia suggests visitors do not climb the summit out of respect

## “Nervous” is how Steve Baldwin says he feels when he sees people climbing Uluru. At least 35 have died while attempting the climb.

for the Adnyamathanha people. Climbing the summit at Mt Warning, in the Northern Rivers region of NSW, is contentious too because it is a sacred men’s ground for the Arakwal people. Some tourism operators there are concerned about the impact an official ban might have. And earlier this year, Parks Victoria banned climbing in eight areas of the Grampians National Park to protect ancient Aboriginal rock art.

Marc has lodged a complaint with the Australian Human Rights Commission, claiming the Uluru climbing ban breaches the Racial Discrimination Act because only Anangu will be permitted to practise their culture. He says it’s also in breach of the lease agreement with Parks Australia that requires it to preserve, manage and protect all cultural heritage: he has nominated the chain, summit monument and five memorial plaques for placement on the National Heritage List, to prevent removal.

“Nervous” is how Steve Baldwin says he feels when he sees people climbing Uluru. At least 35 have died while attempting the climb and many others have been injured, according to government figures. “We have to go up there and do the rescues,” Steve says. “Having been the one who’s managed the last three major rescues, one fatal, I can tell you it’s not fun. It puts our lives at risk. There are cultural and environmental reasons for the closure, but Anangu get incredibly sad when anyone gets injured or dies on the climb. I saw their faces when a man died last year.”

Steve and his rangers will be responsible for enforcement of the ban. A breach could cost \$630 for walking in a restricted area. He cites a legal case from 2016 in which Parks Australia prosecuted three men for taking a short cut, ending in a rescue mission. They were convicted and made to pay costs of more than \$20,000.

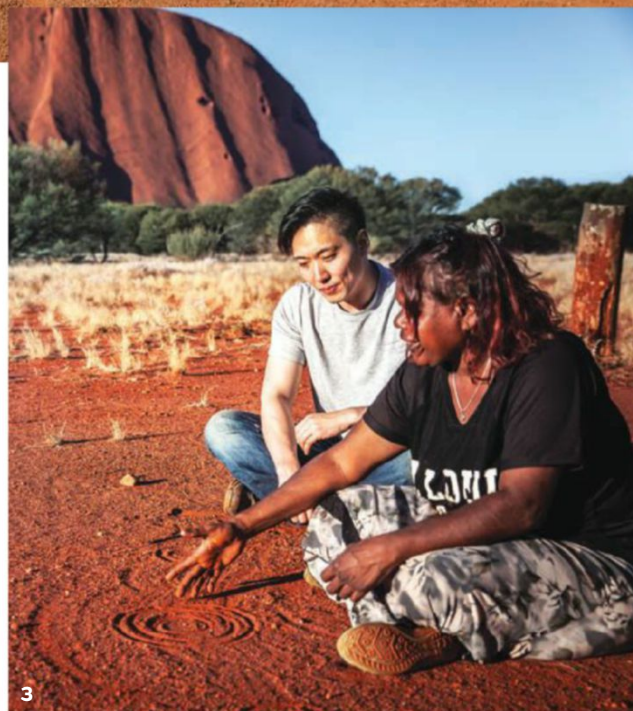
**A**N EARLY MORNING bacon-and-egg roll on a remote desert dune marks the last sunrise of my first visit to Uluru. But word has come of an opportunity to meet with two traditional owners.

I’ve learnt there are nuances in Anangu culture that are essential to grasp: consider things properly before speaking; avoid too much eye contact because it can be considered rude; look at things obliquely to properly understand; share knowledge only when the time is right; avoid direct questioning; live in the here and now.

Author Jen Cowley writes in her book *I am Uluru*, that the word closest to “feeling” in Anangu language ►



Cycling is becoming an increasingly popular way to explore the beautiful surrounds at Uluru.



**1 Anangu Elder** Sammy Wilson tells the Creation story of Kuniya. Sammy was chair of the park board when the decision was made to close the climb.

**2 A helicopter tour** over Uluru-Kata Tjuta NP can be a great way to soak up the area from above.

**3 A visitor listens** to stories from a local Aboriginal artist from Maruku Arts.





A visiting family enjoy an Indigenous-guided garden walk at Uluru, which is a free daily activity at Ayers Rock Resort.

is “kulini”, which encompasses “to listen, hear, think about/consider, decide, know about, understand, remember, have a premonition from a sensation in the body and, yes, to feel”. With this in mind, I head into the park one last time before flying back east.

“Get a mat so we can sit on the ground and talk properly,” says Yuka Trigger, a traditional owner and outgoing board member. She explains the Anangu way of becoming Ninti (learning through experience, becoming familiar). It’s an important part of the way tourists can experience Uluru. “If they’re prepared to sit with me and join in then maybe I’ll show them my culture,” she says. Yuka wants more “young ones” in work. When they see others working, momentum is possible, and they need to be working for their children, she explains.

Yuka is with her niece, Gloria Moneymoon, who explains that she has a five-year-old grandson. “First and foremost for him is learning the Anangu way, but he must also learn the Western world,” she says. “People come from all over to Uluru, but then they go home.”

The women speak in Pitjantjatjara, with some English, and I’m grateful for Alex Mercer from Parks Australia, who sits with us and translates. Their message is unmistakable. The future for Anangu is here in the park and with their community at Mutitjulu, just 5km from the base of the rock. They care deeply about what’s in store for their tjitji tjuta (children), and employment is crucial.

## “My main focus is, how do I get more Anangu in jobs and therefore improve their livelihoods and living conditions?”

“Nyangatja Ananguku ngura [This is an Anangu place],” Gloria says. It’s a phrase about the area’s character, people’s obligations, and what’s necessary for wellbeing.

Grant Hunt, chief executive of Voyages Indigenous Tourism, the company behind Ayers Rock Resort, served on the park’s board with Yuka, his tenure ending in August last year. Together, they voted to end the climb. “My main focus is, how do I get more Anangu in jobs and therefore improve their livelihoods and living conditions?” Grant says. “And second, how do I advance Aboriginal kids who come in [to here] from all across Australia?”

Remote communities such as Mutitjulu have had an unemployment rate of 70 or 80 per cent for decades, he says, with literacy and numeracy their biggest challenges. At Ayers Rock Resort, 334 out of 885 staff are Aboriginal, including 21 Anangu. The generosity of





▲ **Indigenous employment initiatives** at Yulara have been shown to translate into high-quality service and satisfied guest experiences.

► **Menus at the resort's** restaurants and cafes are coded with bushtucker icons. From crocodile ribs to desert herbs and spices, there's a new taste for every meal.



service and attention to detail is unmissable. Whether you're ordering a box of takeaway noodles from Ayers Wok or having a chat with a room attendant, there's a warmth and authenticity that's rare the world over.

"I don't want to park all these guys in gardening jobs," Grant says. "That would be the easy thing to do. We want a sustainable future for them, and that means working across our guest experience area – hotel receptions, warehousing, administration, landscaping, retailing, and as room attendants. If they can stay on Country, close to family, with a foot in culture and a foot in a sustainable future, which comes from employment, that's the ideal scenario."


Of the closure of the climb, he says, "I just think it's time." The Japanese market has many particularly keen climbers, and there's uncertainty about how the grey nomads will respond. But, Grant says, "there's an old saying in tourism, 'nothing new equals no value', and you're very quickly yesterday's destination unless you keep it vibrant, fresh and relevant".

Michelle Whitford, associate professor and researcher in Indigenous tourism at Griffith University, Queensland, says the Uluru climbing ban is by far the most significant case to date of a shift towards greater respect for Indigenous culture in tourism practices. More broadly, increasing numbers of domestic and international tourists are seeking out Indigenous experiences, she says, and

there's growing interest from Aboriginal Australians in establishing and running tourism ventures as a means of preserving and maintaining cultural heritage and traditions while achieving socio-economic independence.

Michelle cites the Quandamooka people on North Stradbroke Island, who are "doing excellent work protecting their culture". Earlier this year, more than 20 of the island's traditional owners opened a new nature walk they had designed and constructed. It's estimated that walking tourism could bring \$16 million a year to the local economy. "If local people are empowered it helps them to be invested, and if they're invested, tourists are going to get a great experience," Michelle says.

**I**SIT BEHIND Gloria Moneymoon in a Parks vehicle as we head to Yulara to collect my luggage. I ask about a container of dried herbs she has with her. "Men would rub it into their shoulders and neck after a big kangaroo hunt," she explains. She lets me in on snippets of her life: how she worked at Ayers Rock Resort in 1991 and spent some time in Adelaide, too. I scurry around for 10 minutes unable to find my luggage. Back at the vehicle, Gloria says she knew which case was mine when I first started looking.

"Palya [Goodbye]," she says, waving from the front of the airport. Then it hits me how much I still don't know about this place and I know I'll certainly be back. 





STORY AND PHOTOGRAPHY BY **PHIL JARRATT**

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# GENERATION OF CHANGE

Born into war and violence,  
Timor-Leste's millennials are shaping  
the new country's future.

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► **There's now much** to smile about for these budding musicians in the Timor-Leste highlands town of Maubisse.









▲ **Patrick Burgess**, director of human rights organisation Asia Justice and Rights, leads a singalong with children on the streets of Maubisse.

THIS IS A HUGE significant year in the history of Timor-Leste (also known as East Timor), one of Australia's closest neighbours and one of the world's newest nations. It marks the 20th anniversary of the Popular Consultation, the independence referendum that took place on 30 August 1999. On that day the Timor-Leste people exercised their right to self-determination and voted overwhelmingly for independence.

This year also marks 20 years since Australian troops were deployed to Timor-Leste as part of the International Force East Timor (INTERFET), the peacekeeping task force that from 1999 into 2000 addressed the humanitarian and security crisis facing the country. INTERFET was led by Australia with (then) Major General Peter Cosgrove at its helm, involved 21 countries and made an important contribution at a critical time in Timor-Leste's history.

Many Australians, including a large contingent of INTERFET veterans, are expected to attend Timor-Leste's anniversary celebrations and the Australian Embassy in Timor-Leste's capital, Dili, is working closely with the government-appointed organising committee to ensure commemorations reflect Australia's involvement.

I'M STANDING WITH human rights lawyer Patrick Burgess on the terrace of an old Portuguese pousada (guesthouse) on a hill above Maubisse, a mountain village in Timor-Leste. We watch as low clouds part in the valley far below, revealing a flooded paddock on which a music festival will soon begin.

In a while, we will head down there to begin filming – we are making a documentary about how young people are shaping a positive future for the formerly war-ravaged country through music, film and art.

For now, Patrick and I discuss the landmark year of 1999. It's the year Patrick arrived in Timor-Leste, located some 700km north-west of Darwin across the Timor Sea, to begin his post heading up the humanitarian section of the United Nations Mission in East Timor (UNAMET).

It's also the year an overwhelming majority of people in Timor-Leste voted for independence from Indonesia. In 1975

Indonesian forces had invaded, just nine days after centuries of Portuguese colonial rule had ended, prompting two and a half decades of conflict between separatist groups and the Indonesian military.

Following the independence referendum in August 1999, a violent backlash erupted; thousands of lives were lost and much of the country's infrastructure was destroyed. In response, Australian troops were deployed to Timor-Leste as part of a multinational peacekeeping taskforce. In October 1999, Indonesia relinquished control of the territory after a quarter-century of occupation, oppression and violence. This ultimately led

to Timor-Leste being recognised as an independent nation in 2002, making it one of the world's youngest countries.

Patrick began his international human rights career five years before taking up his post in Timor-Leste after watching footage on the evening news of the Rwandan genocide that took place in 1994 during the Rwandan Civil War. At the time, the surfer, musician and barrister was living in the beachside suburb of Manly, in Sydney's north. The morning after he watched the horrific footage, he offered his services to an aid agency and he has never looked back.

With his wife, activist Galuh Wandita, Patrick went on to co-found Asia Justice and Rights (AJAR), a human rights organisation based in Indonesia that operates across the Asia-Pacific region. Since it was established in 2012, AJAR has played a vital role in facilitating reconciliation and repatriation in Timor-Leste.



**Despite its controversial origins** – it was a gift from the Indonesian government during the final years of occupation – the Cristo Rei of Dili is regarded as sacred by Timor-Leste's Catholic majority.



◀ **A large range of organic fruit and vegetables** directly sourced from local producers is a common part of traditional Timorese markets featuring open-air stalls.

▲ **One of the many Maubisse elders** who proudly march through the streets in traditional clothing celebrating Independence Day each 28 November.





Filmmaker Shaun Cairns (at left) and the author, Phil Jarratt (at right) with former Timor-Leste president Dr. José Ramos-Horta, in 2017.

## More than 2000 Timorese, mostly women and children, had fled murderous attacks by militia.

I'VE KNOWN PATRICK for several years and he's helped me understand the complexities surrounding the past, present and future of Timor-Leste. Once, at AJAR's Learning Centre in Bali, he showed me grainy video footage of an unforgettable night at the UN compound in Dili, the Timor-Leste capital.

More than 2000 Timorese, mostly women and children, had fled murderous attacks by militia and were headed for what they believed to be the safety of the UN compound. But, because of the uncontrolled violence, UN staff had been ordered to evacuate next morning by air. Patrick was tasked with telling the terrified refugees, who justifiably believed they would be massacred. Distraught staff asked Patrick to plead with the mission head, Ian Martin, who agreed to change the evacuation order, eventually flying all 2000 refugees safely to Darwin. A video filmed just after the original evacuation order had been rescinded shows Patrick leading the refugees in song. To his right a teenage girl claps her hands and sways as tears stream down her face. That girl, Francisca Maia, is now an award-winning writer and director whose short films *Letter to my Mom*, *Decision*, and *Messenger* illuminate different aspects of growing up in a war-torn country.

▼ Dressed in traditional garb, these women of Maubisse play ceremonial gongs on Independence Day, 28 November.



▲ Filmmaker Francisca Maia is one of the brightest stars of Timor-Leste's so-called Generation 99, which is now steering the young country towards a brighter future.

Now 37 and a new mum herself, Francisca tells me, as we walk on the beach near her home, about that night at the UN. The giant Cristo Rei of Dili statue towers on the headland in the distance. "I'd been working as an interpreter for World Vision all day but late in the afternoon we were told there had been attacks...and we should go to the compound for protection," she says. "Then the news came that the UN was going to leave. The refugees were panicking and grabbing their children to run for the mountains to hide, but I decided to stay. I didn't know where my family was; my boss had already fled; I didn't know what to do. I could be dead by the morning. But I sat down and started singing with Patrick, and I began to feel we would be okay."

Francisca is part of what's sometimes called Generation 99, the millennials whose lives have been shaped by the violence and deprivation they were born into. Francisca wants the truth about what happened in Timor-Leste during Indonesian occupation, and what has happened since, to be known. "Even as a young kid, I remember watching the Indonesian TV news and comparing it with...what was happening all around us, and it wasn't the same," she says. "I wanted to scream, 'You are ►





# TROUBLED WATERS

Australia and Timor-Leste both claim ownership of the sea border between them, an area known as the Timor Gap, which contains highly prized oil and gas fields worth many billions of dollars.

AUSTRALIA'S LENGTHY sea border dispute with Timor-Leste began in 1972, when Australia negotiated a maritime border with Indonesia. At the time Timor-Leste was under Portuguese colonial rule and its sea border was not demarcated, leaving a gap in the Australia-Indonesia border leading to the Timor Gap terminology. In 1989, while Timor-Leste was under Indonesian occupation, Australia and Indonesia signed the Timor Gap Treaty: the two nations agreed to share Timor Sea resources in a joint development zone but disagreed on where the sea border should be set between Australia and Timor-Leste, and the latter was left with no permanent maritime border.

After Timor-Leste gained independence it signed the Timor Sea Treaty with Australia in 2002, but no permanent maritime border was negotiated. Timor-Leste argued the border should sit halfway between

the two countries, placing most of the lucrative Greater Sunrise oil and gas field in their territory. Australia argued the border should sit on the Timor Trough, which divides two continental shelves and is located significantly closer to Timor-Leste than Australia.

Australia and Timor-Leste signed the Certain Treaty on Maritime Arrangements in the Timor Sea (CMATS) in 2006 but still no permanent border was set. The treaty ruled that revenue from the Greater Sunrise oil and gas field would be split evenly between the two countries. Timor-Leste, however, officially terminated the CMAT in 2017. The following year it signed a maritime border treaty with Australia at the United Nations in New York that defines

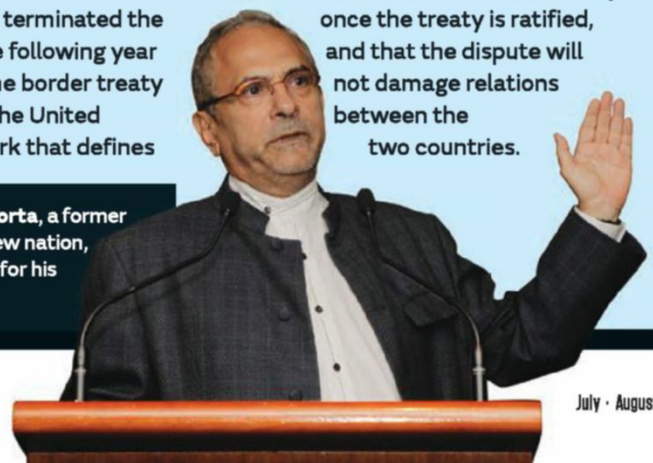
which oil and gas fields belong to each country, with an area worth billions in a yet-to-be-mined gas field to be shared.

This year, because our parliament has not yet ratified the treaty, Australia continued to claim a 10 per cent stake in an oil field that under the treaty now fully belongs to Timor-Leste. The Timor-Leste Governance Project says the field could have generated an estimated \$60 million in the past 12 months.

Former Timor-Leste president and Nobel Peace Prize recipient Dr José Ramos-Horta says he is confident

Australia will return the money once the treaty is ratified, and that the dispute will not damage relations between the two countries.

Dr José Ramos-Horta, a former president of the new nation, continues to work for his country's future.







**Ananias 'Otopsy' Carlos** is leader of the popular band Klamar, whose politically edged songs follow the tradition of earlier protest bands Cinco do Oriente and Galaxy.

wrong, that is not what happened!' I guess that's why I became an interpreter at 17, a TV newsreader at 18, and then a filmmaker – to tell the truth."

Francisca's films explore social problems in Timor-Leste, particularly the history of cultural oppression and political violence. She wants to raise awareness through stories of Timor-Leste's past, to help shape its future. "I think that for my generation, our spirit is bigger than our age, because we have had to take responsibility for our country at such a young age," she says. "Our creative community of artists, writers, musicians and filmmakers tells the stories of our times, because we've been shaped by them. We have no choice. Our country is not a baby anymore. It's growing up. It's time it stood alone, and we all want to help that process."

Nation-building through the culture of youth is not unique to Timor-Leste, but its intensity here is inspiring. It's the reason filmmaker Shaun Cairns and I have been working for more than two years to make our documentary *Generation 99*, which we hope will explain the situation in Timor-Leste to Australian audiences.

We're focusing on the artists, filmmakers, and musicians who, although they were born into conflict, have emerged to create a vibrant new culture that is inspiring hope and prosperity in Timor-Leste. In many cases, their survival itself is inspirational, but how they are using the lessons learnt in war to unite their people in peace is awe-inspiring.



## TIMELINE OF TIMOR-LESTE

● **43,000** years ago:  
First evidence of  
human occupation

▼  
● **1600s:** Timor  
invaded by the  
Portuguese who set  
the island up as a  
trading post and  
a source of  
sandalwood.

▼  
● **1849:** Timor  
splits following  
battle between  
Portuguese and  
Dutch. Portuguese  
take the eastern  
part in the Treaty  
of Lisbon.

● **1974:** Revolution  
in Portugal leads to  
promise to free  
colonies, encourag-  
ing parties to  
prepare for a  
new future.

▼  
● **1975** August:  
Portuguese  
administration  
withdraws to the  
offshore island  
of Atauro.

▼  
● **1975** October:  
Five Australian  
journalists killed in  
the village of Balibo  
along the border  
with West Timor,  
allegedly by  
Indonesian troops.  
There to report on  
Indonesia's illegal  
invasion, they  
became known as  
the 'Balibo Five'.

● **1975**  
28 November: East  
Timor declares  
itself independent.

▼  
● **1975**  
7 December:  
Indonesia invades,  
using its fight  
against com-  
munism as a  
pretext. It annexes  
the territory as its  
27th province, a  
move not recog-  
nised by the United  
Nations. From  
1975, strong and  
ongoing resistance  
to Indonesian rule is  
quashed by violent  
repression and fam-  
ine, leading to the  
deaths of an  
estimated 200,000  
people by 1999.

● **1991**  
12 November:  
Indonesian troops  
fire on mourners at  
the funeral in Dili of  
a supporter of East  
Timorese independ-  
ence, killing 250  
people. Footage of  
the massacre is  
captured by  
journalists and  
released, causing  
outrage around the  
world. The Dili  
Massacre becomes  
a turning point for  
sympathy for  
pro-independence  
East Timorese.

▼  
● **1999** January:  
Indonesia says it  
will consider  
independence for  
East Timor if the  
people vote for  
autonomy.

● **1999** May:  
Indonesia and  
Portugal sign  
agreement to allow  
East Timorese to  
vote on their future.  
Deal endorsed by  
the UN.

▼  
● **1999** 30 August:  
Almost 99 per cent  
of 450,000-strong  
electorate votes in  
UN-organised  
referendum. A clear  
majority (78.5 per  
cent) are in favour  
of independence.

**Greg Shackleton:**  
one of the  
Balibo Five



**1999**  
Australian-led  
forces arrive  
in Timor to  
restore order

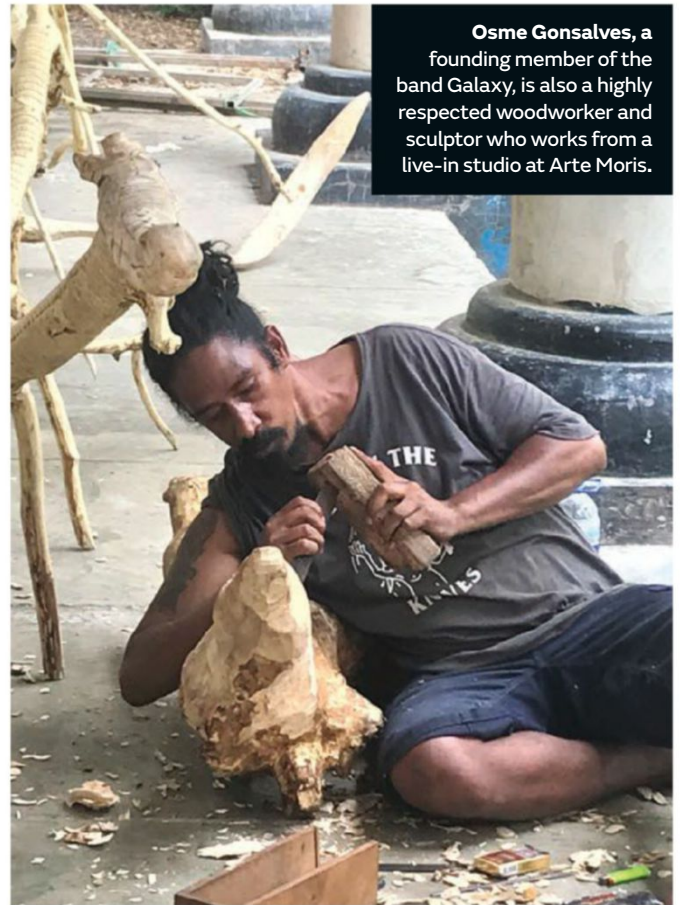




**“Our country is not a baby anymore. It’s growing up. It’s time it stood alone, and we all want to help that process.”**

IT’S ANOTHER HOT and humid Dili morning, with storm clouds already poking above the mountains. Musicians Mele Fernandes and Osme Gonsalves and I seek the shade of a huge canopy of trees surrounding the ramshackle grounds of the Arte Moris (Living Art) centre, located in what was once the premises of the National Museum. The quirky fine arts school, cultural centre and artists’ association was established in 2003 by Swiss artists Luca and Gabriela Gansser, with the patronage of Nobel Prize-winner and Timor-Leste’s former prime minister and president, José Ramos-Horta. “We wanted to show [Generation 99] a better way to express themselves than through violence,” Ramos-Horta told me in a 2017 interview.

The idea was to nurture positive values through artistic expression among the sometimes nihilistic youthful majority born during Indonesian occupation: some 62 per cent of the Timor-Leste population was aged under 25 in 2018. However, the government patronage didn’t last long, and it’s often hard ▶



**Osme Gonsalves**, a founding member of the band Galaxy, is also a highly respected woodworker and sculptor who works from a live-in studio at Arte Moris.

● **Violence erupts** as anti-independence militia helped by the Indonesian military resume campaign of terror, leaving up to 1400 dead. A quarter of the population flees, mainly to West Timor. Martial law imposed. The majority of the country’s infrastructure is destroyed during this attack.

● **Australian-led** peacekeeping force arrives to restore order. Many militia members flee to West Timor to avoid arrest. Indonesian parliament recognises referendum outcome.

● **1999** 20 September: The UN authorised multinational force, known as INTERFET (International Force for East Timor), is deployed to the country, led by Australia’s Major General Peter Cosgrove, and brings the violence to an end.

● **1999** October: UN Transitional Administration in East Timor (UNTAET) established.

**Xanana Gusmao**  
Timor-Leste’s first president



● **2002** April: Xanana Gusmao is elected Timor-Leste’s first president.

▼ ● **2002** 20 May: East Timor becomes officially independent.

▼ ● **2005** June: Australian peacekeepers leave.

▼ ● **2006** January: East Timor and Australia sign deal to divide billions of dollars in expected revenues from oil and gas deposits in the Timor Sea.



**2002**  
East Timor becomes independent

● **2006** May: Foreign troops arrive in Dili hoping to restore order as fighting involving former soldiers, sacked in March, descends into violence. At least 25 are killed and about 150,000 take refuge in makeshift camps.

▼ ● **2006** August: Non-military peacekeeping UN Integrated Mission in East Timor, or UNMIT, is set up.

● **2012** November: Australian soldiers pull out of East Timor – the end of a six-year stabilisation mission.

▼ ● **2012** December: UN ends peacekeeping mission.

▼ ● **2016** September: Permanent Court of Arbitration in The Hague takes up the maritime border dispute between Australia and East Timor over lucrative oil and gas reserves in the Timor Sea.

● **2017** January: Australia signals it will accept East Timor’s move to rescind arrangements demarcating their maritime border.

▼ ● **2017** September: Australia and East Timor reach a breakthrough agreement on their maritime border, ending a decade-long row.







**These women in traditional dress were part of a street march in Maubisse in 2018, celebrating Independence Day.**

## The mountains of Timor-Leste are very beautiful in the wet, but are also reminders of a frightening past.

to tell at Arte Moris what's art and what's decaying ruin. But that, in itself, is a perfect canvas for Timor-Leste's edgy youth culture.

I find somewhere between a tattooist's caravan and Osme's makeshift wood-carving studio to sit and chat with Mele and Osme. They grew up in the 1990s in Lospalos, a hub for resistance fighters and the clandestine movement. Osme was jailed at 12 for punching an Indonesian soldier and both were guerrilla fighters by their mid-teens. Often starving in the hills, they ate dogs to survive and stayed sane by playing music on whatever instruments they could find. With others, they formed short-lived garage bands, until, around the 1999 referendum, they founded Galaxy Band, which quickly developed a cult following.

In 2003 Galaxy Band moved to Dili and set up home at Arte Moris. Soon they were one of Timor's leading rock bands, playing a raw blend of grunge and reggae. After violence erupted again in Dili in 2006 when a political-military crisis led to a series of brutal clashes, they became heavily politicised, their songs a cry from war-weary young hearts. "We write and sing our songs to let the pain out," Mele says, rolling a cigarette then passing the tobacco to Osme. "But after 2006 we also had a clear message to our government. It was to think about governing our country, not about money and cars."

Issues regarding abuses of power are ongoing in Timor-Leste and young people are voicing their opposition. For example, 'Prado protests' have been periodically staged during the past few years in response to the government purchasing expensive vehicles for officials while two-thirds of the country exists below the poverty line. Although they rarely play together these days, Galaxy Band's hard-line approach to these issues has meant they have been banned from playing at official government functions. This, of course, has only enhanced their underground appeal.

**D**OWN IN THE VALLEY we'd viewed earlier, the rain has finally stopped. Singer-songwriter and renowned permaculturist Ego Lemos strides through the mud in gumboots and shorts. He stops to assure musicians their sets will go ahead as soon as the on-stage amplifiers are dry enough to be safe, and jokes with students who've come from all over the country to learn about permaculture but have spent a lot of time huddled in tents trying to stay dry.

"It's good for you," says Ego, laughing. "Makes you appreciate what we went through in the occupation." His eyes scan the sodden valley and the misty mountains that surround it. The mountains of Timor-Leste are very beautiful in the wet,



▼ **A so-called Prado protest** in Dili, 2017, references expensive car models bought for and driven by government officials while much of the country ekes out an existence below the poverty line.



▼ **Legendary musician Toto Lebre** plays the original accordion he used when he joined the groundbreaking Timorese rock band Cinco do Oriente in 1973. He is the only survivor.



but are also reminders of a frightening past, one that Ego is all too familiar with. He pushes his hands deep into his pockets and picks his way through the mud, anxious to complete his rounds in the dying light.

Ego was aged three when his family ran to the mountains to hide when Indonesian occupation began in 1975. They stayed in a bare-earth hideout for four years, during which time Ego lost three siblings to malnutrition and his father to the war. His parents were both musicians – his father played violin, his mother played harmonica. Music sustained them while in hiding and later, when Ego and his mother returned to their life in Dili.

“Although I was very young, I loved the Timorese music they played, with its beats echoing our past, where we came from,” Ego says. “But when we came back to Dili, the music I heard on the radio was all Indonesian. Our music was banned, in case there were resistance messages in the lyrics. But Timorese people are very smart, and soon our musicians learnt how to write a simple love song, with a coded message that only we could understand.”

In early high school, Ego wrote and recorded a love song to Timor’s farmers who were struggling to survive the scorched-earth policies of the occupation forces. That was when his twin loves of growing food and making music first intersected. He forged a distinguished career in permaculture, becoming one of the country’s leading authorities on the sustainable farming and gardening practice and was, in February, inducted into the Earth Hall of Fame Kyoto, which honours global conservation efforts. Ego is also one of Timor-Leste’s most internationally successful musicians. He’s played at festivals worldwide, toured with the late Geoffrey Gurrumul Yunupingu, and composed and performed the title track of the 2009 Australian film *Balibo*.

By 1997 Indonesia had relaxed its ban on local music in Timor-Leste and Ego had put a band together. One day an older musician named Toto came to hear the band practise and suggested they call themselves Cinco do Oriente, in honour of a popular Timor-Leste band from the early 1970s. “We didn’t know much about the earlier band, but we liked the name so we took it,” Ego says “We became the new Cinco do Oriente. After our first gig in Dili, some older people came up to us and

told us to be very, very careful because of the history of the band. We didn’t really know what they meant, but we were soon to find out. You see, in Timor-Leste everyone knows about the three famous fronts in the struggle for independence – the resistance front, diplomatic front and clandestine front – but no-one knows about the cultural front, and yet music and art has played such an important part in keeping our people united. It is the secret weapon.”

OUR LAST INTERVIEW SUBJECT in Timor-Leste has just driven a rough 10 hours from his home in Kupang, West Timor, and is sweating in a singlet in his mother’s courtyard in Dili. Word has spread that Toto Lebre is back, and fellow musicians have gathered. Everyone wants a cold beer and Toto sends out for some, but first he will tell his story, with props. He disappears inside and returns with a CD and a battered piano accordion. He sits down to talk through an interpreter.

When Toto was barely 15, he was one of the best keyboard players in Dili. He was invited to join the original Cinco do Oriente band, whose music combined riffs like those of Jimi Hendrix and Eric Clapton with politicised lyrics reminiscent of those of Bob Dylan. For the next three years the band was offered more gigs than there were nights in the week. They were bold and upfront, and they made their thoughts about the Portuguese colonists and their incompetent government clear. The people loved them. When the Indonesians invaded, Cinco do Oriente was immediately targeted as a disruptive element. Their gigs were closed down, their homes were raided, and their instruments were destroyed. They ran for the hills.

Toto’s 61-year-old face creases and his eyes fill with tears as he reaches the end of his story. “We hid in the mountains and went our separate ways to avoid capture,” he says. “Two of us survived but the three senior members of the band were taken away by the militia and ‘disappeared’. Our music was banned for 20 years. The other survivor moved to Australia, but he died recently, so now it’s only me, and this.”

Toto reaches for his squeezebox and plays an old folk song on its yellow keys, smiling through his tears. After all these years, music is still his secret weapon.





# OLD TOWN NEW PROSPECTS

After casting off its industrial past, Queenstown, Tasmania, is emerging as a destination for nature lovers and artists.

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STORY AND PHOTOGRAPHY BY ELSPETH CALLENDER



The historic West Coast Wilderness Railway, which skirts the King River gorge as it winds its way to Strahan, has helped put Queenstown on the tourist map.





▼ **The Queenstown Post Office**, on the corner of Orr and Sticht streets, was built in 1902 and is one of the town's oldest buildings.

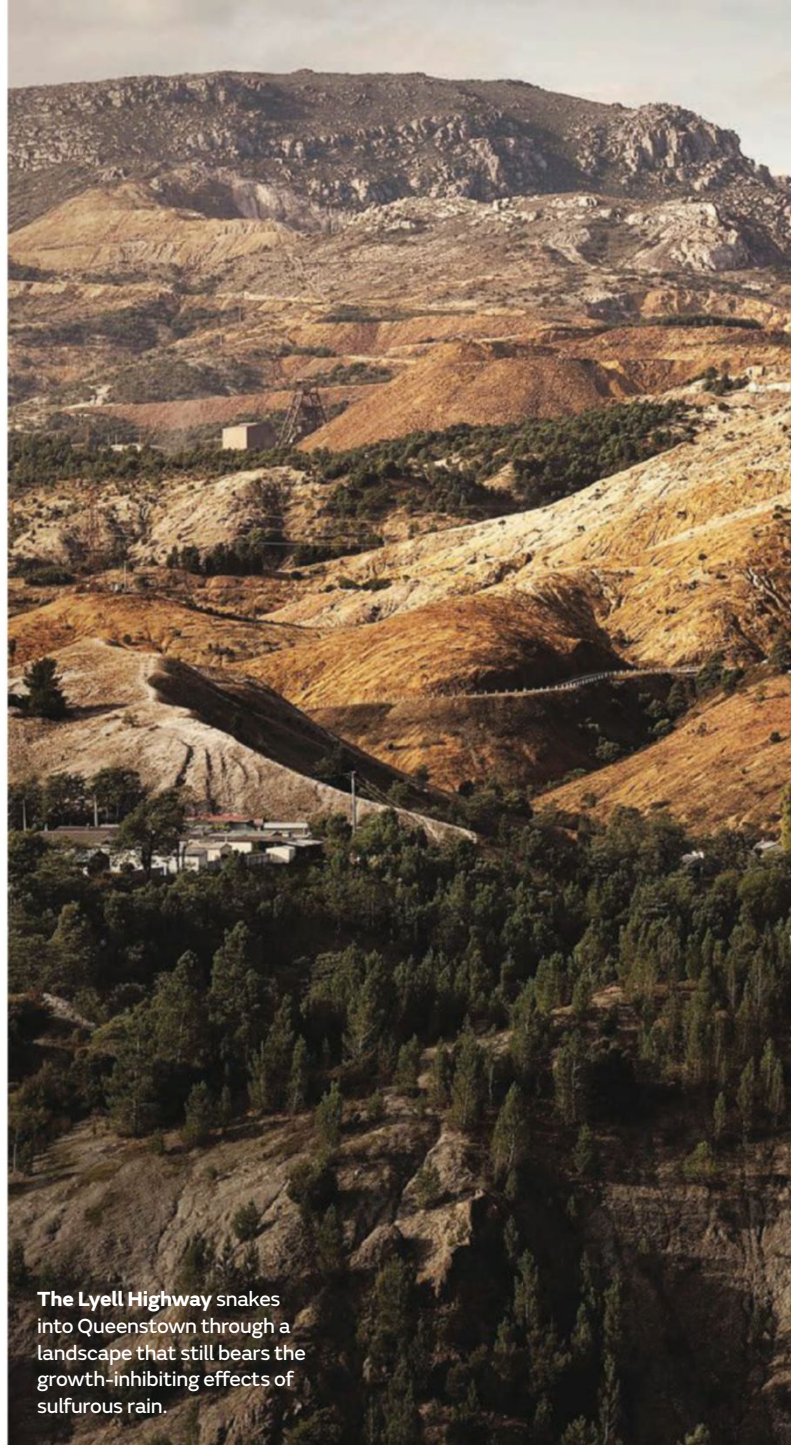


“**Q**UEENSTOWN WAS A redneck, hick, burn-it, bash-it, bury-it mining town,” says third-generation local Anthony Coulson. This former miner now runs wildlife-spotting adventures and abandoned mine tours in the nearby Tasmanian Wilderness World Heritage Area, one of the planet’s last true wilderness regions. He is part of the revolution taking place in Tassie’s most misunderstood town, but feels privileged to have been around for Queenie’s legendary bar fights, lock-ins and advancing lunar landscape.

Not so long ago Queenstown evoked a polarising effect. In fact, its mention still triggers some Hobartians to recount nightmarish experiences. These include running the risk of being punched at questionable drinking establishments; being subjected to the finger while walking through town wearing a backpack, after the protests against the dam that would have tamed the famously wild Franklin River; or witnessing the in-your-face environmental damage locals once seemed so proud of.

For decades, residents of the state’s capital have pointedly bypassed Queenstown and headed to Strahan, a further 40km to the south-west, for weekend and holiday breaks. West Coast Tasmanians and people who’ve made ‘Queenie’ home don’t sugar-coat the brutal landscape, tragic history and rough-edged locals, but they do understand change and the need for it.

The West Coast region covers 9574sq.km and encompasses five towns: Queenstown, with a population of about 1800, is the largest. Travelling from Hobart, 260km away to the south-east, the Lyell Highway eventually becomes what locals call “the road of 99 bends” and crests between the shoulders of Mt Lyell and Mt Owen, where only reed grass and snowberries grow because of historic pollution. For the final 5km descent, which some liken to driving into a mining pit, the rock walls are petticoated in places with wire. Most people are too fixated on the stark landscape and cliff-drop corners to notice the white stones arranged on a hillside across the valley that read “WELCOME TO QUEENSTOWN” in shaky capitals.



**The Lyell Highway** snakes into Queenstown through a landscape that still bears the growth-inhibiting effects of sulfurous rain.

**Q**UEENSTOWN IS ON the traditional land of the Lowreenne and Mimegin people. Aboriginal Tasmanians lived here during the last Ice Age before shifting further west to the coast where food was more abundant, but returned seasonally for hunting and ceremony. When geologist Charles Gould surveyed the area in 1862, he was likely the first European to stand in what was then undisturbed cool-temperate rainforest fed by a clear, rocky river. It’s overlooked by the naturally exposed pink-tinged conglomerate peaks of the West Coast Range where in 1893 an ironstone outcrop known as the Iron Blow was found to contain vast copper deposits and shortly after the Mount Lyell Mining and Railway Company formed. Furnaces for Mount Lyell’s pyritic smelting were fed accessible clear-felled timber. Bushfires destroyed remaining trees on the lower slopes of Lyell and Owen, then sulfurous rain, caused by the smelting, denuded the landscape and inhibited regrowth.

PHOTO CREDITS: PREVIOUS PAGE: TOURISM TASMANIA & NICK OSBORNE; THIS PAGE, TOP RIGHT: LOOK / ALAMY STOCK PHOTO





## Sulfurous rain, caused by the smelting, denuded the landscape.

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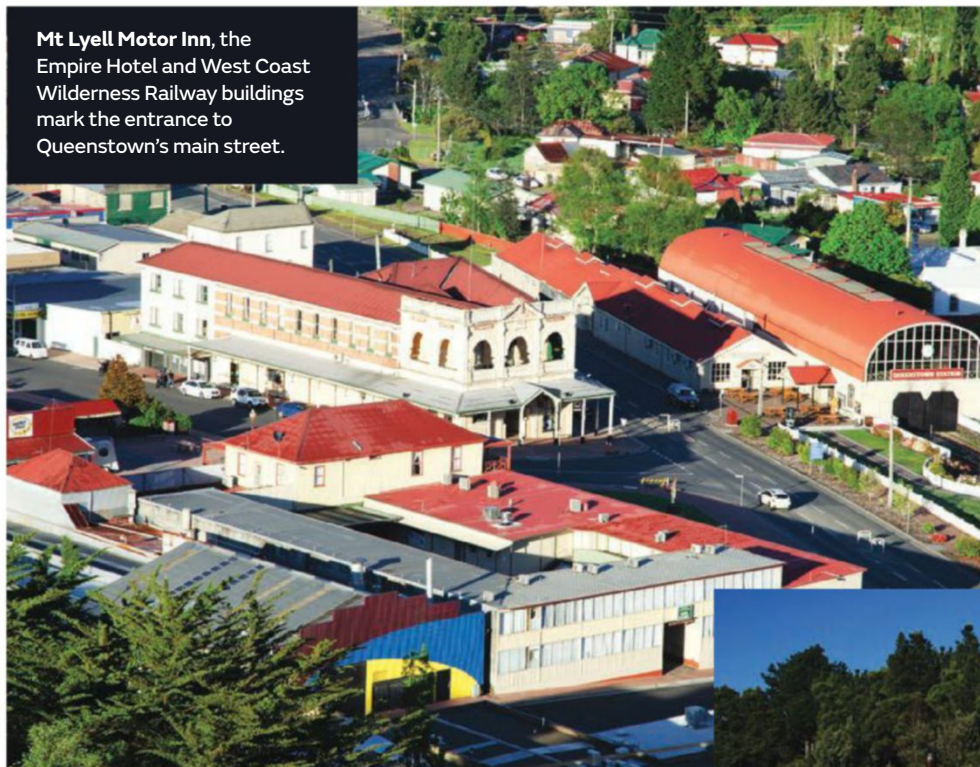
Queenstown's sulfur cloud could sometimes be seen from Macquarie Harbour, more than 20km away, and that rocky river soon ran silvery grey with toxins. When the tent city around the smelters caught fire in 1896, a new town was pegged out a kilometre downriver and named Queenstown. By that time Mount Lyell Mining was so successful that three steamships a week transported its copper ore from Strahan to Melbourne.

By 1901, at a peak population of 5051, Queenstown had a railway, a stock exchange, marching bands, 14 pubs and 12 football teams that practised and played on a gravel oval. In 1912 a copper mine fire broke out with 170 men underground, 42 of whom ultimately died during the disaster. Some bodies weren't recovered until the flooded mine was pumped dry the following year. Many survivors soon went off to war. When completion of the Lyell Highway in 1932 provided access to Hobart, there was concern in Queenstown that it would weaken its unique community spirit.

After Mount Lyell's smelting ceased in 1969, nature began clawing its way back. The Tasmanian Hydro-Electric Commission's proposal to build the Gordon-below-Franklin Dam (within what became Franklin-Gordon Wild Rivers National Park) offered hope to a West Coast littered, by then, with ghost towns. The ensuing battle from 1978 to 1983 (see *Big river* ►



**Mt Lyell Motor Inn, the Empire Hotel and West Coast Wilderness Railway buildings mark the entrance to Queenstown's main street.**



**Lea Walpole (below) sees beauty in her home town's most weathered buildings. Queenstown teens (bottom) soak up the weekend sun on Driffield Street.**



## The claim to fame of Orr Street is Memorial Hall where AC/DC performed in 1976.

*dreaming* AG 148) reinforced a divide in the state between people desperate to save the environment and people desperate for work.

Significant operational changes following the sale of the Mount Lyell mine lease in 1993 marked the beginning of the end of the town's legacy of industry dependence.

Following three more mine-related deaths in December 2013 and January 2014 – altogether more than 200 people have died at Mount Lyell – the mine's operations were indefinitely shelved.

**Q**UEENSTOWN HAS THE look of a mountain town despite its negligible elevation of just 129m. Morning mist can hang above its colourful rooftops or cling to surrounding valley edges at any time of year. For a town that receives about 2400mm of annual rainfall spread across 250 days, a sunny afternoon is a glorious rarity. Winters are cold enough that people can miss 'town' appointments in Burnie, 150km away, due to being snowed in. Some locals say you need to be committed to live in Queenie. Others reckon you just need to be able to put up with a bit of rain.

"For me this place is about authentic experience. It's raw. You need to bring a sense of humour and an open mind," says Lea Walpole, who left at 17. More than two decades later, she's recently moved back, married to a born-and-bred Hobartian who was already Queenstown's pharmacist when they met. Lea has opened a graphic design studio on the main drag of Orr

Street. Her father, aged nearly 80, plants tree ferns and azaleas on a nature strip the town council considers too steep to mow.

Coming into Queenstown, near the final bend of the rust-orange Queen River, are the original Evans store, Galley Museum, Empire Hotel and West Coast Wilderness Railway buildings. The railway was resurrected in 2002 and that got Queenstown onto the tourist radar. Now you've got places like Tracks Cafe, at the station, which is popular with locals and visitors. King River Rafting fits people for thermals and wetsuits in an open-air storeroom above it.

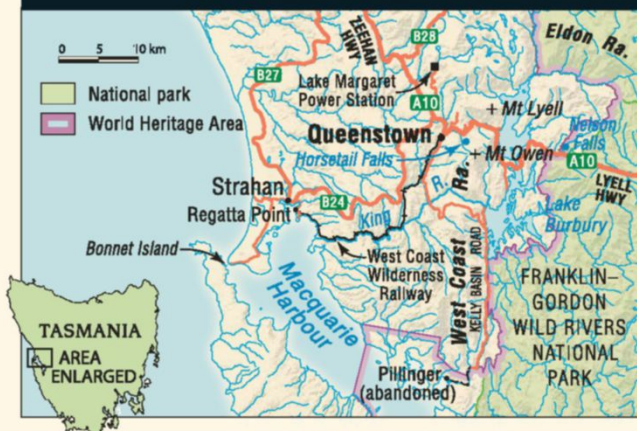
The claim to fame of Orr Street, which is left at Mt Lyell Motor Inn, is Memorial Hall where AC/DC performed in 1976 and Cafe Serenade, which still serves milkshakes in anodised cups. The street is characterised by second-storey verandahs, the striking Q Bank Gallery and alleyway murals. Dramatically backdropping it all is Mt Owen.

Evans IGA and the Marketplace, a shop that stocks everything from fridges to handmade leather thylacines, are both owned by fourth-generation Queenstown retailers. Among them is matriarch Joan Evans, now retired, who genuinely misses Queenstown's totally barren hills when everything was line-of-sight accessible. She isn't alone in calling the mainly radiata pine regrowth "overgrown" but Joan isn't stuck in the past. Her son, Phil, says she's "very popular with the youngsters because she kicks on".

Continued page 103 ▶



# 5 NATURE-BASED EXPERIENCES NEAR QUEENSTOWN



## 2 WATERFALL WALKS

Five kilometres from Queenstown, at the car park opposite Iron Blow Road on Gormanston Hill, is the start of a 500m walkway. Completed in 2017, it edges around the rocky hillside to a viewing platform looking to Horsetail Falls, where the water drops more than 50m down a cliff. The flow ranges from a trickle to roaring gush depending on the season and weather, but the expansive landscape views



are always there. Another 23km east along the Lyell Highway is a walk of a similar length to Nelson Falls, which is located in World Heritage-listed rainforest.

[parks.tas.gov.au](http://parks.tas.gov.au)

## 4 PADDLE THE KING

Along its 52km course from the Eldon Range to Macquarie Harbour, the King River flows through rainforest to south of Queenstown. During the summer, King River Rafting offers flat-water kayaking in the King's quieter reaches and Class II and III whitewater rafting adventures through King River gorge. Their Raft and Steam Experience includes a heritage train transfer back to Queenstown.



Owner-operators Michelle Cordwell-Steane and Paul Steane work with qualified and experienced guides who love the Tasmanian wilderness as much as they do.

[kingriverrafting.com.au](http://kingriverrafting.com.au)

## 1 SEE PENGUINS ON BONNET ISLAND

Penguin-spotting tours on 2.21ha Bonnet Island near Macquarie Harbour's narrow entrance – dubbed Hells Gates during the convict era – depart Strahan at twilight in a small motorised vessel. This intimate eco-tour, run by Gordon River Cruises, allows guests to go onshore and watch the night moves of a little penguin breeding colony from viewing platforms. Stories of Bonnet Island's past signal

station and lighthouse keepers, and the hardships and dangers they faced, are part of the experience.



[gordonrivercruises.com.au](http://gordonrivercruises.com.au)

## 3 OFFROAD PAST AND PRESENT

RoamWild Tasmania tours explore the relationship between Queenstown's industrial history and the area's extraordinary natural attributes. Mountain Heights-Wild Nights, for example, involves driving up the Mt Owen spur to watch the sun set over Mt Lyell and the ghost towns of Linda Valley followed by rainforest wildlife spotting. Lost Mines-



Ancient Pines includes a visit to Bern Bradshaw's Tasmanian Special Timbers sawmill and a walk among living Huon and King Billy pines in the World Heritage area.

[roamwild.com.au](http://roamwild.com.au)

## 5 HIKE TO PILLINGER

In the 1890s Pillinger, at Kelly Basin on Macquarie Harbour, was a busy railway-served port town, until Strahan became preferred. After the last permanent residents left Pillinger in 1943, nature began reclaiming what is now part of the Tasmanian Wilderness World Heritage Area, but some relics have survived or been preserved. The track begins at Bird River Bridge at the end of Kelly Basin Road, 43km from



Queenstown (or 5km before that if the gate is closed or you're in a two wheel drive. This riverside rainforest trail can be muddy, and scrambling over fallen trees is common.

[parks.tas.gov.au](http://parks.tas.gov.au)





At Lynchford Station, the first stop out of Queenstown, engine drivers tend to the steam engine.

# WEST COAST WILDERNESS RAILWAY

**M**OUNT LYELL'S copper smelters were originally separated from the port of Strahan, from where it transported its product, by 20km of muddy packhorse track through dense forest, so surveyors scouted out a railway route. The Queen and King river valleys were suitable but King River gorge was too steep for conventional technology. The answer was an Abt rack-and-pinion railway.

Invented by Swiss engineer Carl Abt, it has two steam engines and a pair of pinion wheels driven by separate steam cylinders. When the steep rack section is met, the pinion wheel cogs engage offset teeth on the centre rack rail for a secure, continuous grip. It was built from 1894 by more than 5000 labourers working six days a week often in cold, rainy and muddy

conditions. Trees were cut by hand and timber spans squared at riverbank mills were dragged along tramways and corduroy roads paved with tree trunks to build bridges.

Construction camps, such as Spur, were places of leaky tents, bad food and sly grog shops: workers brewed sassafras bark beer they called tanglefoot. In winter 1895 they went on strike against long hours, low pay and high provision costs. Contractors telegraphed for replacement workers from Hobart, but storms prevented shipping, so, already behind schedule, they were forced to give in to demands.


Abt Locomotive No 1, built in Glasgow, was shipped in pieces to Strahan and arrived in 1896, without any assembly instructions. Most railway workers had never seen one before, but within a month


it was on the track being tested, and on 18 March 1897 Mount Lyell's 23km narrow-gauge railway officially opened – Australia's steepest at the time, with 48 bridges and countless cuttings.

Small railway settlements and farms developed along places such as Rinadeena, Teepookana and Lowana. The Kerrison family, with 10 kids, operated a dairy farm uphill from Dubbil Barril station. Children from these remote communities who rode the line to school at Strahan were the "train kids". Few had shoes and their packed lunches were often just bread and jam or, in winter, bread and muttonbird.

The railway also transported mail, supplies and visitors. At its peak, a workforce maintained 19 locomotives and more than 100km of track. Eventually, faced with an ageing system, Mount Lyell decided to haul freight to Strahan by road, and in 1963 rail operations ceased.

In 2002, after the building and reconstruction of 39 bridges, 35km of line with three Abt locos opened, the country's only operating heritage rack railway. Its steepest grade is 1:16 from Halls Creek to Rinadeena. Along with a steam train ride, journeys on the West Coast Wilderness Railway can now involve a guided tour of Lake Margaret Power Station, whitewater rafting, a helicopter flight, gold panning and Christmas in July...but no sassafras beer.

For timetable details:  [wcwr.com.au](https://twitter.com/wcwr)



**"Pick 'er up and pull 'er into the yard,"** says engine driver Barry Walding, as he approaches Queenstown Station after a Rack and Gorge tour.



—

“There’s always been a very strong sense of pride in the community.”

Stepping into The Paragon Theatre’s restored interior is a breathtaking experience.



The confluence of the King and Queen rivers.



A depleting population and rock-bottom real estate prices mean tended cottages with blooming gardens adjoin dilapidated homes not worth renovating and abandoned shacks barely breathing. It’s almost impossible to come away from Queenstown not fantasising about buying a fixer-upper with wooden floorboards and pressed-tin ceilings for \$50,000.

Tassie’s West Coast is known to get under the skin. “[It] attracts people who think differently, do things differently and live their lives differently,” says Townsville-born Vikki Iwanicki who returned to Australia looking for community, after many years in New York City. Now the owners of Penghana – originally built as a residence for Mount Lyell’s General Manager – Vikki and her family relocated from northern New South Wales. Friends thought they were crazy moving to a remote Tasmanian town to run a high-end B&B...until those friends visited.

Locals hope artists Helena Demczuk and Glover Prize-winning Raymond Arnold stay because they contribute artistically, culturally and socially. The couple’s home, LARQ, a non-profit studio and gallery, is a converted schoolhouse with a striking exterior in a part of Hunter Street that’s been developing into an artists’ enclave.

Queenstown’s 1930s former grand talkie theatre, The Paragon, has been revived by Anthony Coulson and partner Joy Chappell. Its 2019 program of mainly contemporary music and classic films brings non-pub nightlife to Queenie. Joy is also respon-

sible for Mt Lyell Anchorage accommodation. She’s lived throughout Australia but says “as soon as you come over the hill and there’s Mt Owen in the distance, it’s that overwhelming feeling of coming home”.

What about the town’s rough reputation? Like the polluted Queen River draining into the healthier King at the confluence south of town, it’s being diluted. Handlebar-moustached Danny sells soft-serve ice-creams from a bright pink trailer he built and decorated himself. Queenstown’s tiny corner Caltex has an extensive juggler doll window display labelled “Bob’s collection”. Prospector Rory Wray-McCann exhibits his mineral collections as artworks. The heritage-listed gravel oval now has more sand than rock in the mix. When Anthony came out as a greenie at heart, he soon discovered he wasn’t the only one.

**Y**ES, QUEENSTOWN IS still haunted by its past, judged for its appearance and feels pressure to redefine itself. Since 2016 a biennial visual and performing arts festival, The Unconformity, has been a key vehicle for that, inviting artists to “mine the bones” of Queenstown’s past by creating site-specific works. “We wanted something that’s not shying away from the brutality of what’s happened here,” says Lea, the festival’s graphic designer, “because its brutal beauty and the conflict between industrial devastation and the World Heritage area five minutes away is what draws artists.”

For 2018, 226 people from Australia and around the world applied for an Unconformity artist-in-residence placement. A Welcome to Country by the local Aboriginal community opened the mid-October weekend event. On Saturday night, festival-goers, including Hobartians and Queenie’s local footy team, danced together in The Paragon. The festival’s 30-something artistic director, Travis Tiddy – a fifth-generation West Coaster with his life in Hobart and heart in Queenstown – says that more than three-quarters of people surveyed who attended the first Unconformity said it changed their perception.

“There’s always been a very strong sense of pride in the community,” Lea says “It was only people outside who didn’t understand that.”



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Photo: David Stowe



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P106

## Lake Eyre

Focusing on a rare flooding event

P116


Camel racing  
draws crowds  
in outback  
Queensland

**Floodwaters** make their way down into the dry lake bed of Kati Thanda-Lake Eyre in SA.

PHOTO CREDIT: CHRISSE GOLDRICK

Australian Geographic Society expeditions ● Going wild ● Road trip  
● Recommended travel ● Expedition diary ● Eye in the sky ● Festivals and Events





**Waters arriving from the north**  
have been replenishing the  
parched salt crust bed of  
Lake Eyre North.

GOING WILD



# Taking the Eyre

Nailing the perfect shot of Lake Eyre in flood isn't easy, even with a bird's-eye view, but expert tuition helps a group of keen shutterbugs zone in on the essentials of this rare spectacle.

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Story and photography by Chrissie Goldrick



**A GippsAero GA8 Airvan** flies over the surface of Lake Eyre carrying a group of photographers eager to learn how to perfectly capture this magnificent sight from the air.





**I**T'S BOOM TIME at the tiny outback settlement of William Creek along the dusty Oodnadatta Track in South Australia as news of a once-in-a-decade flooding event at nearby Kati Thanda-Lake Eyre radiates outwards like the effects of a pebble tossed into its turbid, briny waters.

It's a sunny but chilly Friday afternoon in early May and William Creek's quirky hotel has been inundated with enquiries following an ABC TV news item the night before. Footage of water surging down through Queensland's braided inland river channels, turning the red desert green in its wake before emptying into the vast dry lake bed, has pitched William Creek into the global spotlight.

Trevor Wright, proprietor of the William Creek Hotel, woke this morning to more than 200 emails in his inbox, which sent him and his staff into a flurry of activity to meet the sudden demand.

As well as running the hotel, campsite and bar, Trevor, a well-known outback identity, is an experienced bush pilot who runs his own charter airline, Wrightsair. It's based here at William Creek, which is reputed to be the busiest outback airstrip in Australia.



I've been invited by Canon on a guided photography weekend organised under their Canon Collective program, which teams dedicated amateurs with talented professionals in inspiring locations.

During the next two days we'll make good use of Trevor's airstrip and his team of expert young pilots as we explore this locality from the air.

My seven fellow participants and I and our two tutors can't believe our luck. We've come here to learn to take aerial photos, so the flooding event at the lake is an unexpected bonus.

**Canon professional photographer** Jay Collier sets up for a long-exposure shot of the Painted Hills in the golden light of late afternoon.





◀ **William Creek's famed** hotel is an essential comfort stop along the dry and dusty Oodnadatta Track in SA.

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▶ **This airvan is moved into** position for take-off on the recently built airstrip at the Painted Hills.

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We have the use of a couple of eight-seater fixed-wing aircraft, GippsAero GA8 Airvans. Affectionately nicknamed flying bricks, each has a large sliding door that can be pulled back during flight for an uninterrupted view of the landscape below.

Everyone's excited about the photographic possibilities offered by the rising waters, but on the first day we fly off in the opposite direction, to photograph a recently discovered geological marvel – the Painted Hills – in the late afternoon light. The strange, Martian-looking landscape, daubed with strokes of ochre, yellow and red from minerals leaching from the rocks, rises up from the otherwise flat gibber- and claypan-studded plain on the vast Anna Creek cattle station. It's not accessible to the general public by road but it's possible to fly in from William Creek and land on

a recently constructed airstrip to explore the area on foot, or simply enjoy from a scenic flight.

Canon tutor Steve Huddy has advised us on the camera settings best suited to a low-altitude flightpath over the fast-moving scene in rapidly changing light. We reset our cameras accordingly (see page 111 for advice) before strapping in for take-off. During the flight we take turns rotating around the aircraft to sit in the hot seat next to the open door for an unimpeded view of the drama.

Everyone here is a dyed-in-the-wool Canon devotee, me included. Today I've agreed to try out a new Canon camera system but I'm a little nervous. I know my way around my ▶







When photographed from overhead, the crystallised shapes and mineral colours along the lake's dry edges appear as abstract patterns.

trusty old DSLR kit with my eyes shut. But this new camera is foreign to me and I can't afford to miss any shots. I give it a go but keep my usual camera within easy reach.

**W**ELAND FOR A TERRESTRIAL walking tutorial among the hills and valleys before taking to the skies once more to make the best of the approaching sunset. As the light turns gold, the multi-hued hills ignite and the colours intensify to everyone's breathless delight. The photographers' silent concentration is palpable now, broken only by the hum of engines and whirr of camera shutters in overdrive. Before long it's dark and we're back at William Creek for the night. Everyone heads away to their cabins to begin downloading and checking the day's images before dinner in the bustling restaurant of the William Creek Hotel.

We're up and out next day before the Sun for the pre-dawn light over Lake Eyre. As our aircraft climbs above William Creek, the only other thing on the move is a giant road train barrelling down the Oodnadatta Track, sending up a rust-red dust cloud in its wake. A thin white band appears on the horizon broadening with every kilometre until it turns into the salt-encrusted shore of Lake Eyre North. The pilot descends to 500 feet, the door is tugged open, with some effort, and the shooting begins. As the Sun appears, it illuminates seemingly limitless waters.

The pilot descends to 500 feet, the door is tugged open, with some effort, and the shooting begins.

The vastness of the scene is hard to capture in a single frame but the ever-cheerful Steve Huddy offers encouragement as we rotate around the aircraft to take up the coveted shooting position at the door. The low angle of the early sunlight throws the crystallised salt formations along the shoreline into sharp relief and it's these intriguing abstract sculptures on which Steve recommends we focus our lenses.

When not shooting through the door, I'm experimenting with the new mirrorless model. It's lighter than my Canon EOS 5D Mark III so I'm starting to see the benefits, but I'm certainly not game to rely on it solely just yet. We explore the far reaches of the lake for a couple of hours, flying in low along the Warburton Groove, where the fast-flowing floodwaters from the north funnel down a narrow channel before emptying into the lake proper.



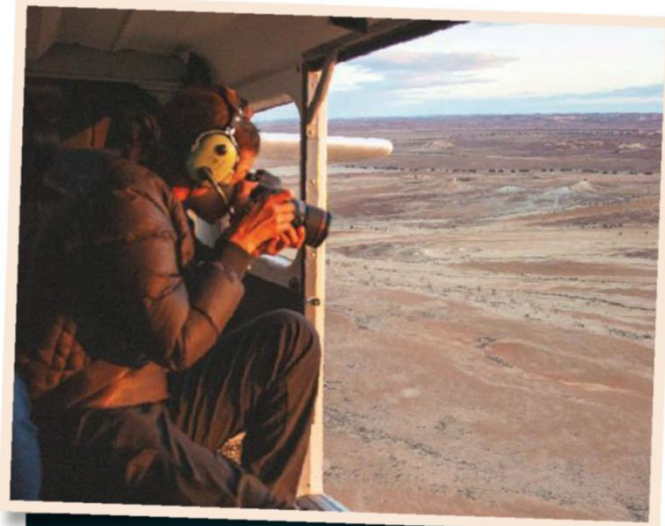
▼ **Heavy rains that** fell in QLD during February 2019 recently began infiltrating Lake Eyre (top). Jay Collier reveals a few photo processing tricks and tips to Heather Rose, Onofrio Deserio and other members of Canon Collective (bottom). Sobrina Pavan from Perth takes her turn to shoot through the open door of the airvan as it approaches the Painted Hills (right).



By late morning we're back at camp and gather together to share the morning's images and learn a few image processing tips and tricks from Canon professional Jay Collier, and from each other. Everyone seems grateful for the downtime to process photos, charge batteries, eat, and explore the William Creek precinct.

In the afternoon we're in the air again and this time Trevor Wright is at the controls. Trevor's a trove of local information and keeps us entertained with his witty anecdotes and stories of his 35 eventful years at William Creek. He knows the lake well and flies us around even more of its jaw-dropping immensity. He explains how the wind can move the entire body of water from one part of the shallow lake bed to another. The putty-coloured water ripples gently in today's light breeze and the numerous islands and crusty shorelines provide interest, colour and texture for our photos.

**T**HE CLEAR AUTUMN sky above William Creek is perfect for stargazing so later that night when the Moon's up, Steve and Jay lead us beyond the lights of the little township to a rusty disused former Ghan railway bridge to learn the art of astrophotography. I point my tripod head and camera at the sky and snap away, adhering to the expert instructions, but can see nothing at all on the playback screen in the inky darkness. ▶



## How to shoot aerals with Jay Collier

Try to opt for open-door aircraft if you can. Shooting through windows not only restricts your view but often results in images that lack sharpness, clarity and detail. It's not always possible, however.

Ideally carry two cameras and two lenses to save changing them. This allows you to capture a variety of shots at wide, medium and long focal lengths. A wide-angle zoom on a full frame DSLR, such as the Canon EF24-105mm f/4L IS, and a second camera with a longer lens, such as the Canon EF 70-200mm f/2.8L IS USM III, is a good combination.

At lower altitudes, up to 500 feet, the ground moves faster, whereas at higher altitudes of more than 1500 feet ground speed is reduced. The lower you are, the faster your shutter speed needs to be. In general, a shutter speed of 1/2000th will freeze ground motion at lower altitude. At higher

altitude, shoot at 1/500th to 1/800th as a minimum, although in all cases, if there's plenty of light you can always afford to shoot faster and eliminate all risk of motion blur or vibration caused by the aircraft.

Set the camera to manual exposure and use auto ISO. This set-up allows you to select your desired shutter speed and the camera then automatically shifts ISO to maintain the correct exposure as you pass over different areas and light sources. Use exposure compensation to allow your images to be brighter or darker. Shoot on autofocus but select AI Servo.

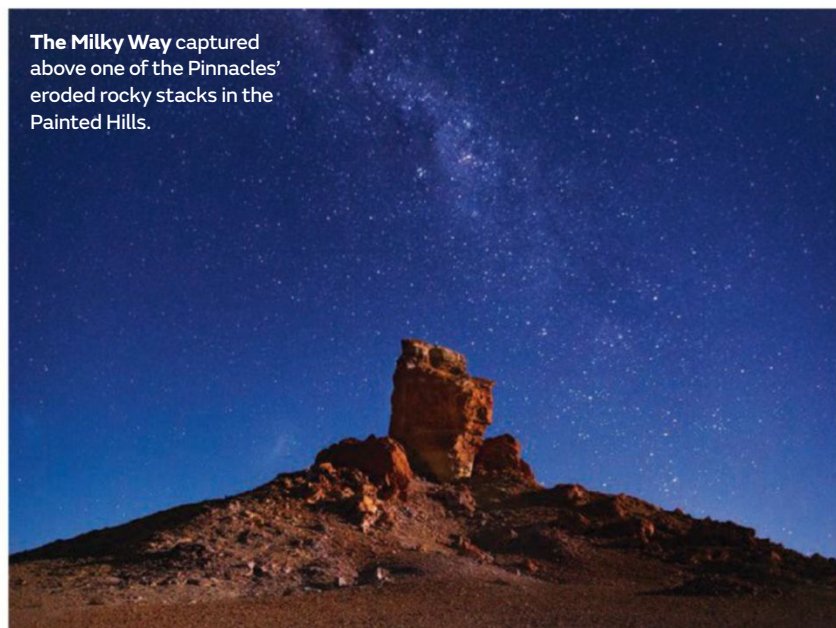
Mirrorless cameras are a good choice for aerals. Canon's new EOS R features a digital viewfinder that shows exactly how the image will look before it's taken, giving you confidence to press the shutter and nail that shot.

For more info visit [canon.com.au/collective](https://canon.com.au/collective)

**WIN** a trip to Lake Eyre with APT. See page 123 for details



The Milky Way, almost invisible to the naked eye in the night sky, miraculously looms out of my photos.



The Milky Way captured above one of the Pinnacles' eroded rocky stacks in the Painted Hills.



▲ The bar of the William Creek Hotel is dutifully attended by Nicolas Sommerhoff Croquevielle, whom everyone knows as 'Nico'.



▲ The colours of the Painted Hills are the result of oxidised iron and sulfur leaching through the weathering sandstone.

The Milky Way, almost invisible to the naked eye in the night sky, looms miraculously out of my photos when I download them the next morning and I'm thrilled to have acquired a new skill.

Our cohort of shutterbugs hail from all corners of Australia and all walks of life. They're united by a love of photography and the wild places it can take them and they all cherish the opportunity to travel with like-minded souls.

Heather Rose from Vermont in Victoria is a regular at Canon Collective's one-day workshops in Melbourne with Jay Collier, but it's her first trip away with the project. "Every time I work with Jay I learn something new," she says. "He has a knack of figuring out exactly where people are at with their photography. He's not intrusive and is always able to teach me something new." Heather is an experienced aerial photographer, but this year Lake Eyre is something special. "It's a once-in-a-lifetime opportunity to see the lake the way it is at the moment. I love the abstract nature of what you can see in there and what others can see in your images of it."

**O**NOFRIO DESERIO from Pascoe Vale in Victoria is a keen birdwatcher and it's that passion that has brought him to photography. "The natural extension of identifying birds is to record them with a camera" he says.

There aren't too many birds to shoot in this arid region of SA so I ask him what drew him to photograph here. "I needed

to do more than shoot 2-inch-high birds and I wanted to try my hand at this kind of landscape photography," he says. "It has been amazing to see Lake Eyre as this great ocean, like an inland sea." For Onofrio, one of the highlights has been the contrast between the surrounding desiccated desert and the life-giving waters with their promise of new growth.

"It's so difficult to capture because it's so large," he says of photographing the lake. "Even the widest-angle lens has a tighter perspective than the human eye, so I decided not to take photos all the time but to look with my own eyes and take in the abstract shapes and patterns. I hope I have also captured that in my photos."

We bookend our stay at William Creek with one final flight back over the Painted Hills in the fleeting dawn light. I set up both cameras in the way I've been taught and snap furiously away while I'm 'on the door'. But the rest of the time I decide to follow Onofrio's example and simply gaze out through the perspex window to try to absorb the beauty and power of a landscape that few will ever get to experience.

It gives me time to reflect on the true magic of photography as a pastime or a profession – of its ability to take us to places off the beaten track and encourage us to really look closely to identify and capture the beauty in any scene and, hopefully, communicate that beauty to others.

AG

● **CHRISSE GOLDRICK** travelled courtesy of Canon and Canon Collective.



**As water funnels** into Lake Eyre via narrow channels, new green growth develops along its banks.





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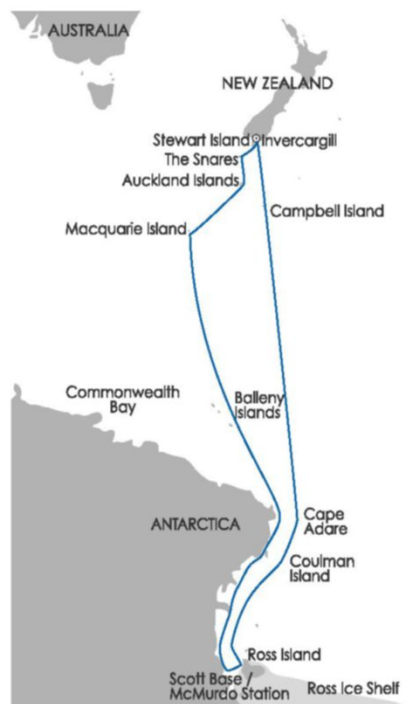
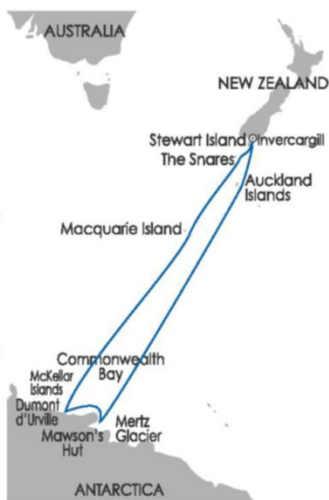
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Celebrate Christmas this year inside legendary Australian explorer Sir Douglas Mawson's Hut at Cape Denison, Antarctica.

Pioneering expedition cruise company Heritage Expeditions is looking for adventurous Australians to join us on a true voyage of discovery as we follow in the footsteps of an Australian icon and attempt the first successful landing at Cape Denison, Commonwealth Bay in eight years.

Heritage Expeditions has timed its voyage to maximise the opportunity to land and explore this once off limits majestic and historic location. Our voyage to the Huts, built for the 1911-1914 Australasian Antarctic Expedition, includes paying respects at the Memorial Cross for Ninnis and Mertz who perished during the infamous three-man Far Eastern Party sledging trip, which Mawson himself barely survived.

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1 – 13 DEC 2019, 3 – 15 DEC 2019,  
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Festivals and Events

# Off to the races

A rural community embraces its diversity  
with a festival celebrating culture...and camels.

STORY AND PHOTOGRAPHY BY MANDY MCKEESICK





**Troy Richardson and Wookatook** romp in lengths ahead of the rest of the field to win their heat in front of a large crowd at the annual Tara Festival.





The Tara Festival is a family-friendly event, where even children get a chance to ride the camels.



**C**LOSE YOUR EYES for a moment and listen. There's the hum of a didgeridoo, splutter of a chainsaw, acoustic twang of Creedence Clearwater Revival and the shrill call of a bagpipe. "They're quick out of the barriers today," a race-caller spruiks, and then there's a low animal sound you can't quite place. Now take note of the smells – definitely something animal, motorbike fumes, spicy curry, freshly baked bread.

Confused? Now open your eyes. You're face to face with a woolly-headed camel as it gurgles and groans, a race-caller is chasing yabbies, someone is performing a haka and two mad motorcyclists are preparing to enter a steel-meshed Globe of Death.

You've found yourself at the Tara Festival of Culture and Camel Races.

It's hard to arrive at one word to encapsulate this festival, which is held every two years in the rural town of Tara on the Western Downs of southern Queensland. Madcap springs to mind; eclectic comes close; kaleidoscopic, perhaps. But, while the senses and vocabulary are reeling, it's fair to say it's one hell of a show.

## Country strong

Tara is renowned for agricultural and pastoral activities, particularly prime hard-wheat production. It has a population of little more than 2000, fewer than half of whom live in town. In the 1980s some of the area's agricultural land was subdivided into small rural acreages, or lifestyle blocks, leading to an influx of new residents – although it was nothing compared with festival time, when the population soars to 16,000.

"We wanted to do something special for Tara," says festival committee member Lou Thornbury of the event's origins. "We did the 'sports shears' for a couple of years, but that faded, and then we saw camel races in Boulia [in far western Queensland] and thought, 'That looks like fun.' So in 2000 I went to Boulia to learn about organising a camel race and in 2001 we held the first Camel Cup here in Tara."

Lou's husband, Richard Thornbury, chimes in: "Mary Youngberry was starting a cultural festival at the same time to recognise all the different nationalities moving into the area with the subdivisions. So we combined to become the Tara Festival of Culture and Camel Races.





◀ **With galloping camels** being almost impossible to steer and just as hard to stop, the mid-race action gets frantic in a heat of the Camel Cup at Tara.

▼ **Cameleer Glenda Sutton** (at left) and her one-humped racing partner, Chief, celebrate a win in a heat with Tara Festival committee member Lou Thornbury.



**“The highest price paid for a yabby was \$2500 several years ago.”**

## Clawing to the finish

It's mid-morning on the first of the festival's three days and the crowd is three-deep around an unpretentious ring where Goondiwindi stock agent Alex Paterson is auctioning yabbies. “Have a look at the legs on this one,” he says. “Its sire won this race three years ago.” The crowd suspends disbelief and laughs. “Anything under \$150 is cheap,” Alex continues, “and you know they're only going to get dearer as the alcohol sets in.”

A syndicate from Brisbane outlays \$190 and squeals erupt as their blue-clawed crustacean stumbles across the line in first place, earning them a cool \$710.

“The highest price paid for a yabby was \$2500 several years ago,” says Tara local and yabby coordinator Linda Petersen (now president of Tara

► **Although it's an aquatic creature,** a yabby can travel more than 50km across land between waterholes.



Festival Inc.). “A group of boys who'd been working on the mines were here for a good time. They opened their wallets and it was all green! Unfortunately, their yabby didn't win.”

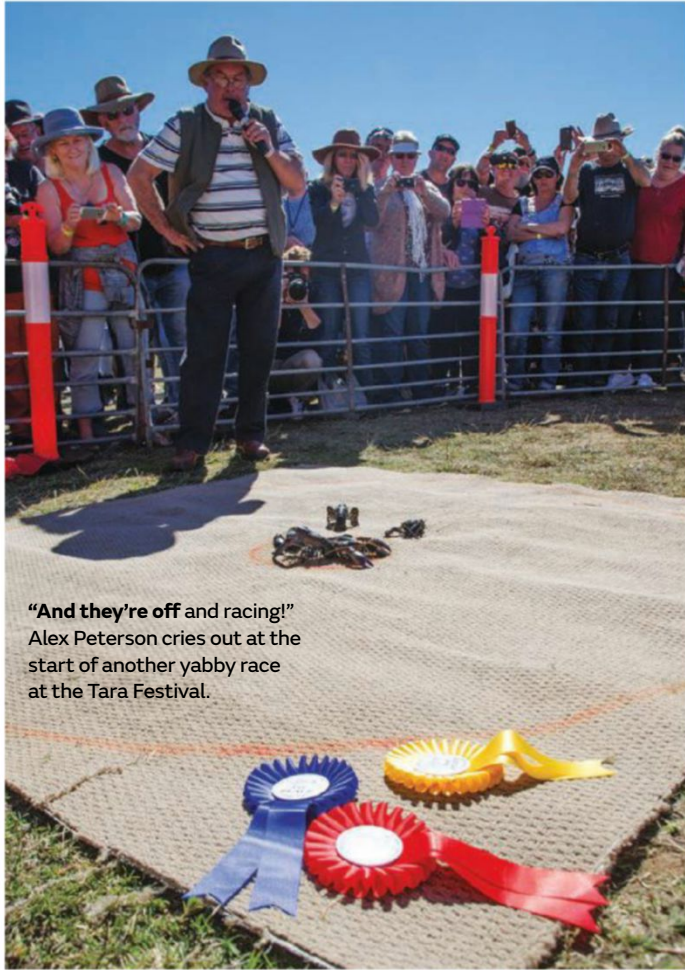
Yabby racing isn't even the main event. That gong goes to the camels.

In the mounting yard, John Richardson's bullock camel Wookatook is hooshed (sitting) and waiting for its jockey. It gurgles and mumbles and appears to be discussing race tactics with its trainer.

Nearby, Rod Sansom's Captain is more fractious. New to racing, his growls (Captain's not Rod's) are more menacing and he spits his nerves around the ring. “This is Gambler,” Condamine trainer Jack Dempsey says of his bullock. “It will be a gamble if he runs straight.”

To race a camel, a harness is strapped under and around its mid-section with a padded, though seemingly insignificant, seat for a jockey located behind the hump. Once the ►





**“And they’re off and racing!”**  
Alex Peterson cries out at the start of another yabby race at the Tara Festival.



**Bernard Mangakahia encourages**  
audience participation in his  
show *Mana: The Spirit of Polynesia*.



**Globe of Death** riders Sam Fennell  
(at left) and Justin Ryan pause  
for a moment on their Yamahas.

jockeys are mounted, handlers lead the beasts to the starting line, avoiding long legs and snaky necks, and then the race is on. Camels ease into a gallop. Well, most of them do. Gambler turns 360 degrees and nearly takes out his handler before rejoining the field.

Jockey Chontelle Jannese sums up the spectacle. “You never know what’s going to happen, but it’s a good adrenaline rush,” she says. “There are also days when I think, ‘Just get me caught.’” By ‘caught’ she means caught – literally. Once the camels are racing, the jockeys have little to no steering and definitely no brakes. Past the finish line, the camels come to a halt at a hessian fence and the handlers, ferried there on the back of a ute, catch the camels and can then offload the jockeys.

## Good on the dance floor

The camel and yabby races alternate. “This one’s bred in the purple,” Alex calls out as he continues spruiking the crustaceans to the crowd that’s now six-deep around the ring. Meanwhile, cultural performers are in full swing on three stages around the ground.

The entertainment is a nonstop parade of talent, which more often than not requires audience participation. Bernard Mana, in his Spirit of Polynesia show, entices two blokes to don wigs and join him on stage for a haka. Alvin Rostant and Jorge Morales have a

**“You never know what’s  
going to happen, but it’s a  
good adrenaline rush.”**

line-up of wannabe reggae dancers channelling their inner Caribbean shimmy. Three young girls clad in camel hats stare wistfully at a performer from the Heilani dance troupe. There are didgeridoos and bagpipes, steel drums and country guitars. There is even a crowd-pulling appearance by the 2017 winner of *The Voice Australia* competition, Judah Kelly, fortuitously booked before he found television fame.

The cultural entertainment is reflected in the array of food, from Japanese miso soup to Spanish paella, Greek souvlaki and wild-caught barramundi. Jim Smith even has what’s claimed to be the world’s first mobile bakery and can churn out 1000 pies in an hour.

The roar of a small motor advertises Matty G. who is carving a camel from a block of wood – with a chain-saw. The throb of larger engines advertises Justin Ryan and Sam Fennell, two young blokes for whom riding





their Yamaha TTR 125cc motorbikes upside down in a steel-mesh globe is all in a day's work. "I broke my scapula eight weeks ago," Justin says, "but it's good enough." Their questionable sanity is eclipsed only by their MC, Jack Wilson, who stands in the globe as Justin and Sam fly around him dangerously like deranged mosquitoes. "Make some noise for the boys," Jack urges the spellbound crowd. "If the bikes stall, the boys fall."

Revved up from the Globe Riders, the crowd gets into party mood. Pissed and Broke, a group of caravaners who are part of the 2000-strong contingent camped around the ground, wish to conduct their own race down the straight on inflatable animals. The request is politely declined.

### An inspector calls

Overseeing the merriment are Senior Constables Dave Masters and Simon Shilton from the Queensland Mounted Police. Horses traditionally don't like camels and although Dave's Manny has seen it all before, Merlin, Simon's Percheron, is wide-eyed and nervous as he takes in the strange beasts being led to the start of another race.

Tara farmers Mark Thomson and Jim Moran are the race officials at the barriers, lining up the camels and then firing a shotgun to get proceedings underway. "We only have 12 people on the whole committee and can

always use more," Mark says, "but you do what you can for your community." Between them, Mark and Jim help run the horseraces, show society, clay target club and hospital auxiliary. Their contributions are typical of those in country towns.

The 400m Cup is the final event on today's program and it's won by genuine legends of the camel-racing fraternity – Glenda Sutton and her camel, Chief. They have won the Boulia and Bedourie cups and will be hot favourites for tomorrow's 600m Cup. Glenda has been training and riding camels for 20 years. "It's not for the weak-hearted," she says, laughing. "You have to be brave about everything. You have to push forward no matter what, and you have to ignore the size of the animal. You're working with 90 per cent mind and 10 per cent body."

Glenda and Chief retire for the day as Alex Paterson fires up the crowd, which now forms a solid wall between the yabby ring and conveniently placed bar. The patrons lap it up. They have lost money on yabbies and camels, dined on exotic dishes, rumbaed through some Latin dancing and are still trying to work out how to describe this festival to their mates, but one thing's for sure – they'll be back tomorrow, and have already booked their tickets for the next Tara Festival of Culture and Camel Races. **AG**

**THE NEXT** Tara Festival is 2–4 August 2019.



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Angela Robertson-Buchanan's monochrome magpie is one of the shortlisted photos in the AG Nature Photographer of the Year competition.



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**Above** Journey along the iconic Birdsville Track; Witness the pink hues of Lake Eyre from the air; Travel in style aboard a custom-designed 4WD.

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# Expedition diary

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## Polar adventure

Step back in time and visit Mawson's Hut, a frozen capsule of how daily life was for a polar adventurer during the Heroic Age of Antarctic Exploration.

**S**IR DOUGLAS MAWSON was one of the 20th-century's most renowned polar explorers. Visiting the immaculately preserved huts that served as headquarters for the 1911–14 Australasian Antarctic Expedition to explore one of the most wild and remote locations anywhere on Earth has got to be on the bucket list of anyone who yearns for their own epic adventure. So it's great to be able to travel there with one of the most experienced expedition cruise companies, Heritage Expeditions, which returns to Antarctica again during the 2019–20 season. Mawson's Hut is at Cape Denison on Commonwealth Bay, which has historically been one of the few ice-free and readily accessible areas along the East Antarctic coastline. Its accessibility was the main reason Mawson chose it as the location for his hut and the base

for his South Pole explorations. In 2010, however, a 78km-slice of the Mertz Glacier broke off, blocking the annual movement of sea ice and isolating the region. Now access to the bay is freeing up again. With an ice-free summer predicted there are opportunities to return once more and explore this legendary location that's been off-limits for almost a decade. Heritage Expeditions has timed its 2019–20 summer voyage to maximise the opportunity to land at Commonwealth Bay and explore Sir Douglas Mawson's hut and its environs. This includes the Memorial Cross to expeditioners Ninnis and Mertz, who perished during the infamous three-man 'Far Eastern Party' sledging trip (which Mawson himself barely survived). Nesting near the hut are substantial numbers of Adélie penguins and Wilson's storm petrels.



### In the wake of Mawson

**J**OIN HERITAGE EXPEDITIONS on the complete expedition vessel the *Akademik Shokalskiy*. This class of vessel is world-renowned for polar expeditioning because of its strength, manoeuvrability and small passenger numbers. Built in 1984 for polar and oceanographic research, it is fully ice-strengthened.

- Follow in the footsteps of legendary Australian explorer Sir Douglas Mawson.
- Join an authentic expedition cruise of discovery along isolated East Antarctica's Commonwealth Bay.
- Explore subantarctic Islands including wildlife haven Macquarie Island.
- Navigate spectacular ice formations on this unforgettable adventure traversing Mertz Glacier to Cape Denison.
- Whale-watch from the ship and Zodiac-cruise to penguin colonies and gigantic ice shelves as we retrace history.
- Visit Mawson's Hut on Christmas Day.

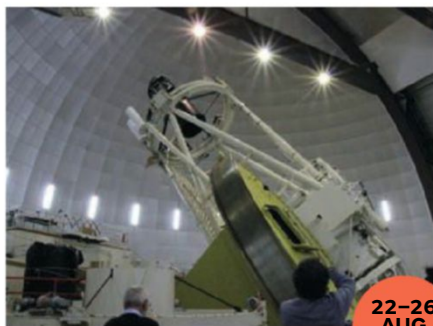
**DATES:** 15 December 2019 – 8 January 2020

**COST:** From US\$17,880

**BOOKINGS:** Email [info@heritage-expeditions.com](mailto:info@heritage-expeditions.com)

**BOOKINGS:** Call 1800 143 585 or visit [heritage-expeditions.com](http://heritage-expeditions.com)





22-26  
AUG  
2019

## Explore Australia's night sky

Explore the night sky with **Fred Watson**, Australia's Astronomer-at-Large and AUSTRALIAN GEOGRAPHIC's specialist space writer, on a University of Melbourne Citizen Science project. You'll enjoy a behind-the-scenes look at the telescopes of Australian National University's Siding Spring research facility, just outside the NSW town of Coonabarabran, learn about astrophotography and how to stargaze like an expert, and so much more.

**COST:** From \$1995pp. Includes all activities and most meals

**DATES:** 22-26 August 2019

**BOOKINGS:** Call 1300 707 313 or email [marnie@darkskytraveller.com.au](mailto:marnie@darkskytraveller.com.au)



AUG OR  
SEPT  
2019

## Lightning Ridge fossil digs

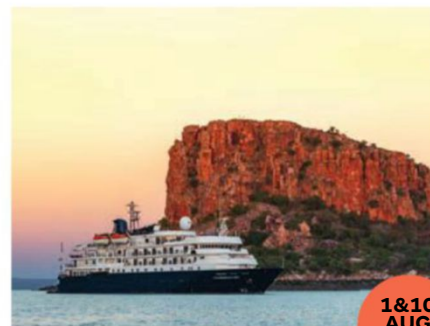
The Society offers you a chance to hunt for rare opalised fossils. Guided by experts, you'll discover new specimens for the Australian Opal Centre's world-leading museum collection. Enrich your knowledge of opals and gems, opal-mining history, opalised fossils and new dinosaur discoveries.

**WHO:** Australian Opal Centre

**DATES:** 26-31 August 2019 or 2-7 September 2019. Week 2 is available for return participants only

**COST:** \$2200pp. Includes all activities, lunches, most dinners

**BOOKINGS:** Call 0427 904 587 or email [dig@australianopalcentre.com](mailto:dig@australianopalcentre.com)



1&10  
AUG  
2020

## Explore the Kimberley coast with APT

Join APT and the AGS on a 10-day expedition cruise, exploring the Kimberley coast on an intimate small ship. Venture out daily on Zodiac excursions to remote locations usually inaccessible to most travellers and explore areas teeming with marine life. Be hosted by an experienced AGS host – Jo Runciman or Todd Tai. Enjoy an all-inclusive lifestyle on board, where everything is taken care of, and learn from your expert expedition team.

**WHO:** APT

**COST:** From \$10,195\*pp (twin share). Save \$2000\* per couple (already included in price shown)

\*Terms and conditions apply

**DATES:** Departing 1 August and 10 August 2020.

Week 2 is available for return participants only

**BOOKINGS:** Call 1300 184 577



13-24  
SEPT  
2019

## Swim with the humpbacks of Tonga

Join Canon Master photographer Darren Jew and his team for another unforgettable adventure with humpback whales in Tonga's Vava'u group of islands in 2019. This 12-day tour includes local activities and optional photo sessions with Darren and co-host Jasmine Carey.

**WHO:** Darren Jew's Whales Underwater

**COST:** From US\$7580 ex Vava'u, Tonga

**BOOKINGS:** Call 0415 932 273 or email [reservations@whalesunderwater.com](mailto:reservations@whalesunderwater.com)



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GEOGRAPHIC  
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4-15  
OCT  
2019

## Saltwater people of northern Australia

This small-ship expedition aboard *Coral Discoverer* to Australia's remote northern coastline will immerse you in the songlines and stories of this ancient country through the artistic and cultural traditions passed on by generations. Enjoy shore excursions to remote communities, encounters with nature and onboard workshops.

**WHO:** Coral Expeditions

**COST:** From \$10,695pp (twin share)

**BOOKINGS:** Call Coral Expeditions on 1800 079 545 or email [reservations@coralexpeditions.com](mailto:reservations@coralexpeditions.com)



28-30  
OCT  
2019

## Aussie Ark experience

Join Tim Faulkner for a unique hands-on experience with this Tasmanian devil and eastern quoll breeding program in the beautiful Barrington Tops of NSW. You will see devils up close as you help with feeding and monitoring individuals. Also there'll be opportunities to explore the region's natural treasures and spot local wildlife at night. Don't miss your chance to get involved.

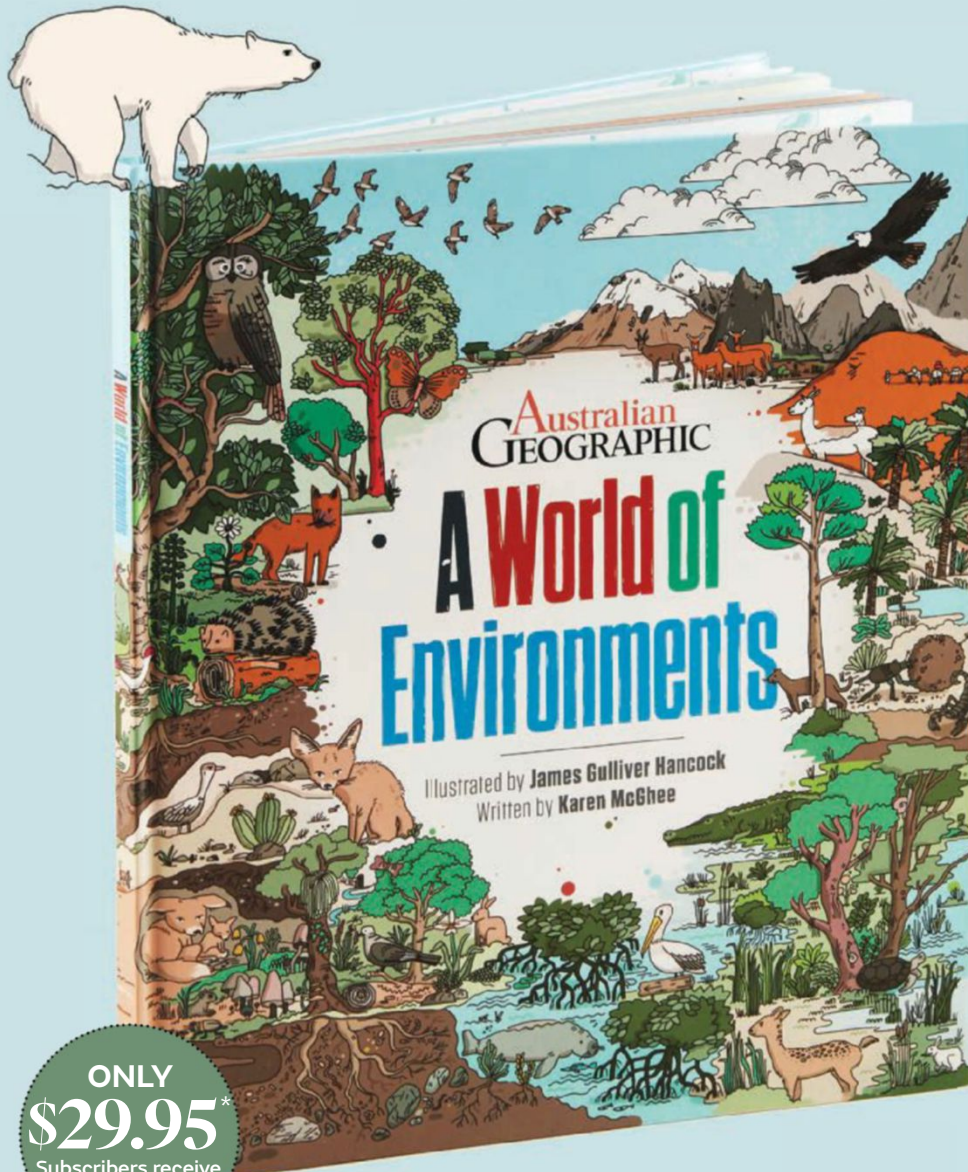
**WHO:** Aussie Ark

**COST:** From \$1400 for adults

**BOOKINGS:** Call 02 4340 8610 or email [admin@devilark.org.au](mailto:admin@devilark.org.au)



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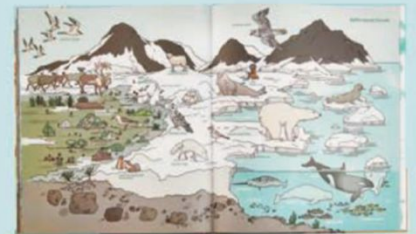
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unparalleled snapshot of Planet Earth's most critical habitats.

80-page hardcover, 290mm (h) x 250mm (w). Ages 8-12 years. Product code: AGR314

\*Excludes applicable postage and handling costs.





# Expedition diary

**DATES: 12–24 November 2019**

## Pioneers and frontiers of Papua New Guinea



Explore Australia's PNG connections on a 12-night expedition along the north-eastern coastline aboard the new *Coral Adventurer*. The voyage starts in Cairns with a charter flight\* to Madang. We then sail north to the Sepik River mouth to enjoy the village lifestyle before heading along the coast, passing the active Manam Motu volcano and visiting WWII battle sites at Buna and Sanananda. Travel with AG Editor-in-chief Chrissie Goldrick as we explore the reefs and rainforest shorelines of Tufi Fjord and learn the myths of the Dei Dei hot springs. Local guides will show us villages where spirited welcomes, markets and singing performances will delight. \*Additional cost

**WHO:** Coral Expeditions  
**COST:** From \$11,290pp (twin share)

**BOOKINGS:** Call  
Coral Expeditions on  
1800 079 545 or email  
[reservations@coralexpeditions.com](mailto:reservations@coralexpeditions.com)

**BOOKINGS:** [coralexpeditions.com](http://coralexpeditions.com)



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**DATES: 2–14 January 2020**

## Raja Ampat and the Spice Islands odyssey

Scenic beauty, diverse wildlife and rich histories make this a journey of discovery and adventure like no other. Meet your AG Society host, Cornelia Schulze, in Darwin, board a charter flight\* to Biak, West Papua, then board the new *Coral Adventurer* for a 12-night odyssey through the rarely visited Coral Triangle islands. Swim with Cenderawasih Bay's whale sharks, explore Fort Belgica and share tribal rituals and ceremonies. \*Additional cost

**WHO:** Coral Expeditions  
**COST:** From \$11,290pp (twin share)

**BOOKINGS:** Call  
Coral Expeditions on  
1800 079 545 or email  
[reservations@coralexpeditions.com](mailto:reservations@coralexpeditions.com)

**BOOKINGS:** [coralexpeditions.com](http://coralexpeditions.com)



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7–19  
SEPT  
2020

## Ningaloo and the bluewater wonders

Join AG's Dr Dean Miller on a voyage to WA's remote and beautiful Coral Coast on board *Coral Discoverer*. Departing from Broome, it will visit the spectacular Rowley Shoals Marine Park, Dampier Archipelago and historic Montebello Islands and culminate in a visit to Ningaloo Reef, home to gentle giant whale sharks and manta rays.

**COST:** From \$11,590pp (twin share)  
**BOOKINGS:** Call Coral Expeditions on 1800 079 545 or email  
[reservations@coralexpeditions.com](mailto:reservations@coralexpeditions.com)



7 NOV  
2020

## Circumnavigate Australia

To mark Coral Expeditions' 35th anniversary, Australia's pioneering cruise line has announced a circumnavigation of the Australian coastline in 2020 aboard the new flagship *Coral Adventurer*. Visiting 35 places that shaped Australia. The trip's unique VIP events will make it a voyage to remember. The 59-night voyage begins and ends in Darwin.

**DATES:** 7 November 2020–5 January 2021  
**COST:** From \$38,860pp  
**BOOKINGS:** Call 1800 079 545 or email  
[reservations@coralexpeditions.com](mailto:reservations@coralexpeditions.com)

## AG SOCIETY PHOTOGRAPHY TOURS

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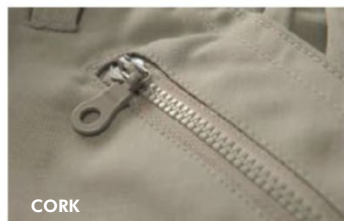
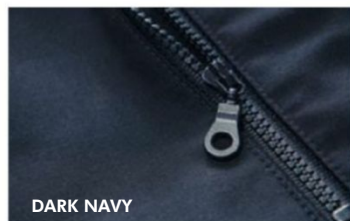
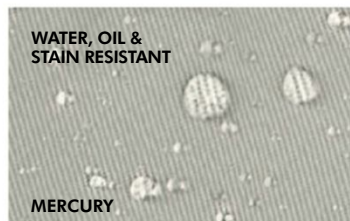
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### Weekend for two: \$499 (valued at \$670)

Two adult passes to Altina Wildlife Park, two nights accommodation at Leeton Heritage Motor Inn in a King Spa Suite, breakfast daily, bottle of premium local wine on arrival, late check-out, wifi, Netflix, and three-course dinner for two at Pages on Pine.

### Family of four weekend escape: \$599 (valued at \$836)

Family pass to Altina Wildlife Park, two nights accommodation at the Leeton Heritage Motor Inn, breakfast daily, bottle of premium local wine on arrival, late check-out, wifi, Netflix, and dinner for four at Pages on Pine.



**SAVE**

## Iceland circumnavigation

**I**CELAND IS A REMOTE volcanic island with mind-blowing landscapes and fascinating culture and history. With most of the country uninhabited, much of its terrain consists of plateaus, mountain peaks, and fertile lowlands and one of the best ways to reach these remote areas is by ship. Aurora Expeditions explores many deep fjords ideal for kayaking\* and Zodiac cruising, and glaciers, including Europe's

largest, Vatnajökull. All this is enjoyed with splendid birdlife and friendly locals.

\*Additional costs apply.

**WHO:** Aurora Expeditions

**DATES:** 2–12 June 2020

(11 days)

**COST:** From \$10,700pp (twin stateroom), plus further savings available

**BOOKINGS:** Call 1800 637 688 or email [info@auroraexpeditions.com.au](mailto:info@auroraexpeditions.com.au)

[auroraexpeditions.com.au](http://auroraexpeditions.com.au)



**SAVE \$2000\***

## Arnhem Land Expedition Cruise with APT

**E**XPLORE ARNHEM LAND'S remote coastline and the pristine Tiwi Islands on an eight-day small ship expedition cruise aboard the MS Island Sky. Land on the Gove Peninsula and experience a Welcome to Country ceremony on South Goulburn Island. Get a bird's-eye perspective of Arafura Swamp on an included scenic flight, and see 60,000-year-old art styles take shape before your very eyes. Enjoy an all-inclusive

lifestyle on board where everything is taken care of for you.

**WHO:** APT

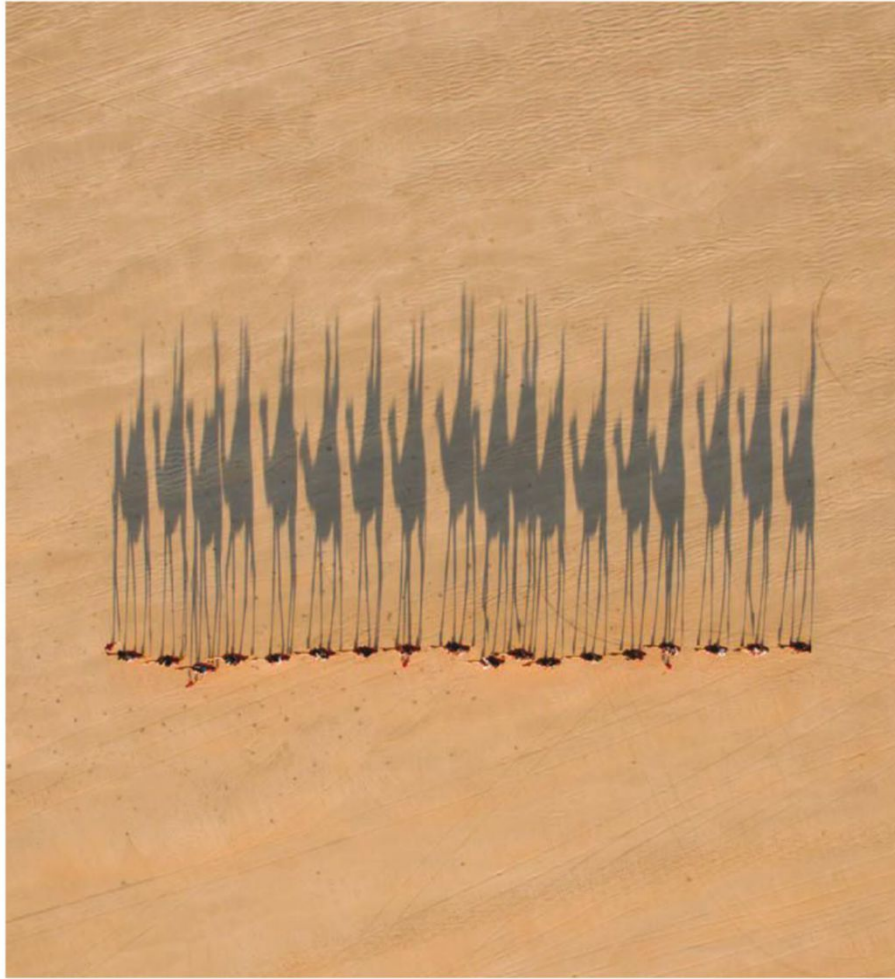
**DATES:** Departs 29 June and 25 July 2020

**COST:** From \$9395\*pp (twin share), save \$2000\* per couple (already included in price shown). \*T&Cs apply

**BOOKINGS:** Call 1300 184 577 or visit [aptouring.com.au/ArnhemLand](http://aptouring.com.au/ArnhemLand)

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## Camel rides, Broome

By Jarrad Seng

CABLE BEACH, just north of pearling and tourist town Broome on the Kimberley coast, Western Australia, has become world-renowned for sunset camel rides, since the 'ships of the desert' were first brought here in the 1980s. Late afternoon images of the activity have spread across the globe, but don't often show this perspective. Shooting from above captures perfect camel-shaped shadows, cast eastwards across the golden sands of the 22km-long beach by the Sun setting over the Indian Ocean.

AG



DJI Phantom 4 | Lens: 20.7mm | Settings: f/2.8 | 1/220s | ISO 100



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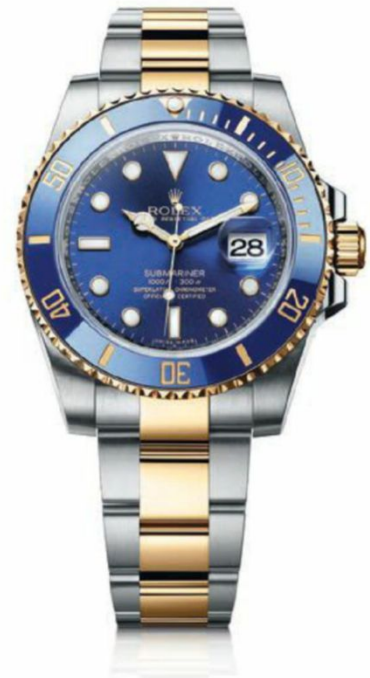


DAVID DOUBILET

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